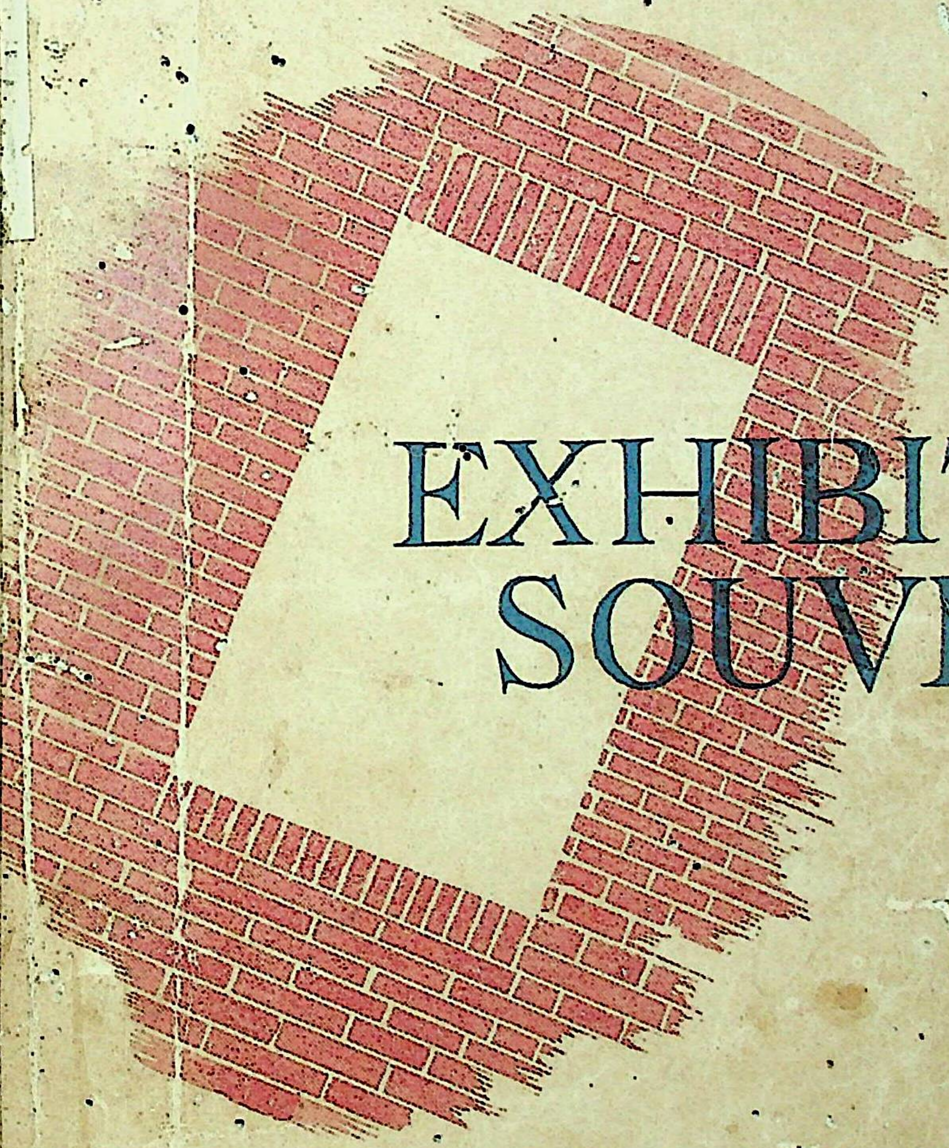
INTERNATIONAL EXHIBITION
ON LOW COST HOUSING



EXHIBITION SOUVENIR

OVERNMENT OF INDIA
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INTERNATIONAL EXHIBITION

ON

Low-Cost Housing

NEW DELHI

January to March, 1954

EXHIBITION SOUVENIR

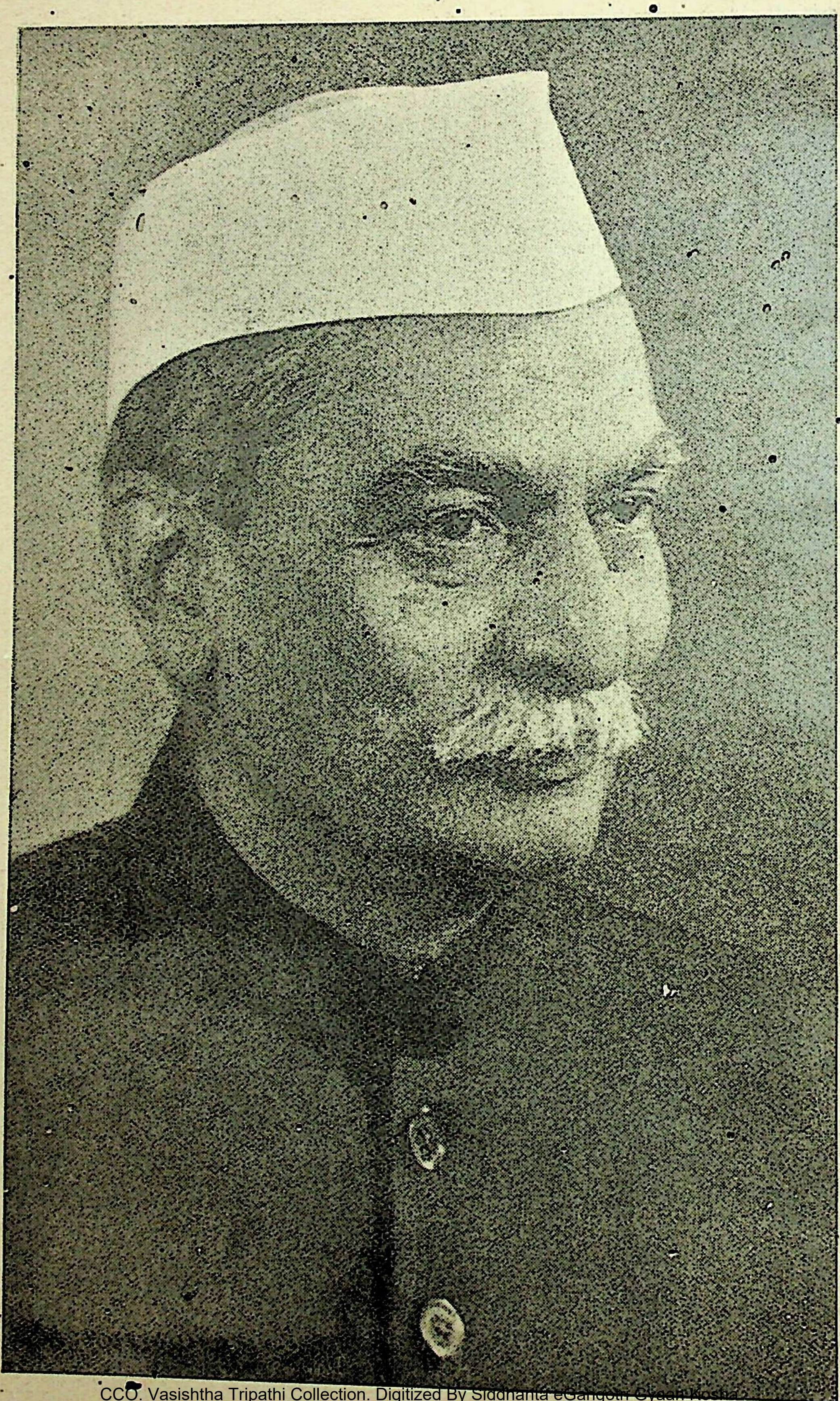
MINISTRY OF WORKS, HOUSING AND SUPPLY,
GOVERNMENT OF INDIA.

Revised Edition

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CONTENTS

MESSAGES



सत्यमेव जयते

RASHTRAPATI BHAVAN,
NEW DELHI

5th November 1953.

The Ministry of Works, Housing and Supply, Government of India, deserve congratulations on focussing attention on the acute problem of housing, by holding this International Exhibition. As a result of the partition of the country in 1947 and consequent mass migrations from one place to another the problem has become baffling. Seventy percent of the people of India live in villages and it is therefore necessary to provide them with houses which could be built with materials easily available in villages and care will have to be taken to have buildings which would suit the climate of our country which varies very considerably in different parts. We want healthy, artistic, cheap houses and the Exhibition will serve a very useful purpose if it can help in evolving patterns which will suit the tastes and fulfil the requirements of the people in various parts of the country. I need hardly say that I shall be looking forward with great interest to the Exhibition and wish it all success.

Rajendra Prasad



NEW DELHI.

2nd November 1953.

In a country which is so poor and backward as India, if the elementary needs of food, clothing and shelter are to be satisfied; we have to resort to methods which do not involve much cost. This Exhibition on Low Cost Housing, I hope, will educate not merely the people of this country but also the members of our Government in the matter of providing housing for the large millions of our people who to-day find themselves without any secure shelter. I wish the Exhibition every success.

S. Radhakrishnan



New Delhi,
25th October, 1953.

I am very glad that we are having this International Exhibition on Low-cost Housing in Delhi. Next to food and clothing, proper housing is one of the primary necessities of life. It is true that the necessity for housing in a warm climate is not quite so great as in a cold climate. Even so, it is obvious that no standards can be maintained without proper housing accommodation. Apart from this, the greater part of India is not such a warm country.

We must change all our ideas about housing. We take for granted not only the mud huts of our villages but the fact that large numbers of people have not even those mud huts. I have no objection to mud structures and, indeed, I would like to encourage them in villages, provided we improve them greatly. We must think in terms of every family having a proper shelter. I think that the minimum accommodation that any family should have is two rooms, a kitchen, a lavatory and a small verandah. If possible, a little open space also. If the open space is difficult, a group of small houses should have a common open space.

It is often said that when we have large numbers of people without even a single room, why should we try to give two rooms to a family. There

is something in that, but not much. I think we should definitely aim at two rooms for a family. It may be, of course, that for the present or under pressure the two rooms might be occupied by two families. I do not like the idea, but I would have to submit to circumstances. But that would be only a temporary expedient till the two families are separated and each given a two-roomed little house. The idea of one room for a family is bad. The old idea of so-called servants' or workers' quarters with one small and dark room without proper ventilation or anything and with no sanitary or other facilities, was an abomination and should be condemned out of hand.

If we are to have large-scale house construction, we must give up the idea of encouraging very big houses. I can understand various sizes of houses, of course, but the really big ones must be avoided and not even encouraged so far as the private owners are concerned. We have a limited amount of material and what goes in the very big house comes up to many small houses.

We must, of course, pay full attention to the sanitary, drainage, water, lighting and other facilities. These are even more important than a roof. In fact, it would be desirable to think of these even before actual house construction begins. We must also look at these matters from the architect's point of view and not merely that of an engineer. There is no reason why we should put up ugly and unsightly structures because they are meant for humbler folk. Grace and beauty are not really expensive and if slight extra expenses are involved, it is worthwhile. The environment in which people live and children grow up affects them powerfully. We should like our people to develop not only higher standards of living, but some appreciation of beauty. This can be provided by small parks and children's playgrounds, etc.

Essentially the question comes back to the cost of the structure. That is the importance of this exhibition. Any lowering in cost means more houses. We have experimented in the past, in various parts of India, with various types of small houses, and we have thus had a large experience to draw upon. The International Exhibition will bring within our ken the experience of other countries. It seems essential, both from the point of view of cost and otherwise, that local materials should be used, with such processing as might be necessary. We can never have really large-scale planned house-building all over India with materials brought from a distance. Our old standards have to be revised completely. The P.W.D. usually thought in terms of heavy structures, thick walls, etc., which added to the cost. This appears totally unnecessary now. Overhead charges can certainly be brought down also.

In any major housing programme in the country, there has to be full cooperation between Governmental authorities and the public. Laws and rules and regulations of municipalities should be such as to encourage building. Housing Societies should be formed, as they are being formed, preferably on cooperative principles and not to exploit a situation for the advantage of a few and the disadvantage of the many.

We are on the eve of big developmental changes in India. Industries are growing up. Community Projects and National Extension Schemes are attacking the static village. In considering these developments, we must always keep in view housing. Any factory, that is planned, should include good housing for all its workers. Also amenities, social welfare centres, children's education, children's playgrounds, etc. In the older factories, it would be a good thing if a certain sum was set aside from the profits every year for

housing and amenities. This should not be looked upon as a philanthropic gesture, but as something necessary for the social well-being of the people working there and, therefore, for their greater efficiency and effectiveness.

I have mentioned many matters which might appear to be beyond the scope of an exhibition on low-cost housing. But I do not think they are outside their scope. A house is not merely a place to take shelter from the rain or the cold or the sun. It is, or should be, an enlargement of one's personality, and if human welfare is our objective, this is bound up with the house. Indeed, changes in housing in other parts of the world have effected social revolutions in the community.

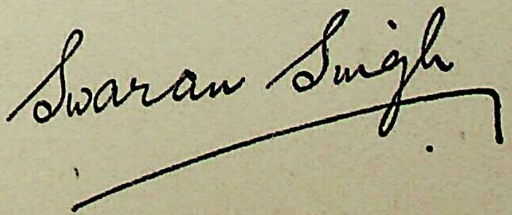
Jawaharlal Nehru



MINISTER FOR WORKS, HOUSING & SUPPLY,
INDIA.

New Delhi, December 11, 1953.

The International Exhibition on Low-Cost Housing, I venture to hope, will prove to be an event of great significance. It is now quite clear, all over the world, - and, particularly, in undeveloped areas - that the insuperable obstacle to the provision of adequate housing for millions of people in a reasonable period of time is the enormous amount of finance involved. Also, it appears to be quite meaningless to hope that any State, by purely governmental action, can create satisfactory housing conditions for all its citizens. The irresistible conclusion, therefore, is that as in most other matters, the realisation of the goal of adequate housing is very much a matter for the people themselves. While steps must be taken to provide as much cheap finance as possible, the greatest contribution that a Government can make appears to lie in an earnest attempt to discover techniques and materials which will make the cost of building much lower than it is. It is as a humble part of this colossal world effort that this Exhibition is being organised. I am certainly not hoping that, as a result of this Exhibition, revolutionary changes either in building practices or in the use of building materials will take place; but, if the designs and techniques exhibited make some significant contribution either to reducing the cost of building or to the improvement of the quality of housing, I shall be satisfied that the Exhibition has been well worth the effort. May the judgement of the people confirm our hope!



Speech by SARDAR SWARAN SINGH, Minister for Works, Housing and Supply, at the inauguration of the International Exhibition on Low-Cost Housing, 20th January, 1954.

Shriman Rashtrapatiji, Your Excellencies, Ladies and Gentlemen,

I am deeply grateful to the Rashtrapati for having graciously agreed to inaugurate this International Exhibition on Low-Cost Housing.

The idea of holding this Exhibition was mooted about a year and a half ago, in order, not only to pool together in a practical way the existing knowledge on building techniques, materials, methods and designs but also, to try out new ideas with full-size model houses specifically set up for the purpose of carrying out these experiments. A number of our engineers and architects, with the background of their Indian experience, have been abroad and have come back with new knowledge of how things are done in other countries. Not always, however, have their new ideas received the reception which they deserved. This is not surprising, for the building industry is one of the oldest industry known and does not always react to fresh ideas with the same felicity as other industries. And it is not only the industry—influenced by engineers and architects, the masons, the carpenters and others—which resists change: it is the financier, the administrator and, above all, the people themselves who live in the houses, who are chary of innovations. This Exhibition, we therefore, felt, would enable all these elements to *see* for themselves many of the new ideas given concrete shape, real life-size houses, and to judge the utility and performance of something with which

they have not been familiar so far. Above all, we felt that the people who have to live in the houses, which we hope will be within the means of most to either rent out or purchase, must be encouraged to think of them, not in the traditional terms of massive structures, with broad verandahs and corridors, but in terms of the reality that faces them today. This reality is not the same as it was a hundred or even thirty or forty years ago. The tempo of living has increased: we are becoming more and more urbanised,—in the good and desirable sense of the term—and we must adjust ourselves to this change. The functional role of the house has changed and, unless we adapt ourselves to this change, we will not be able to solve the housing problem with which we are faced today. The high cost of living, the scarcity of land, the rising cost of development of land and of the building materials, all point to a kind of structure and, in fact, of living, which cannot be what we have been accustomed to so far. This Exhibition, we therefore thought, would be of some educative value to our people whose need for housing and at a "low-cost" is so pressing.

We were encouraged in holding this Exhibition by the response we received from the international bodies connected, in one way or another, with housing. In our decision to organise this Exhibition at New Delhi, the Economic Commission for Asia and the Far East and the United Nations Technical Assistance Administration saw a useful opportunity of extending the scope of the Exhibition to include their activities in the sphere of housing. They have co-operated with us whole-heartedly to make this Exhibition a success and, in their decision to hold a Seminar on Housing and Community Improvement, they have presented to us an opportunity of getting the views of experts on the various houses which have been set up at the Exhibition. The value of this Exhibition has been further enhanced by the decision of the International

Federation for Housing and Town Planning to hold their South East Asia Regional Conference in Delhi during the Exhibition. All of us are bound to benefit by the examination and discussions which this galaxy of talented men and women from various countries will have on matters relating to housing with special reference to the low-cost housing exhibits which are on display at this Exhibition.

A house is not a haphazard collection of building components. It is built to a design and with a specific purpose; the materials which go into the making of it have to be selected with a view to obtaining the maximum of utility consistent with minimum costs. It is here that the demand is made on the ingenuity that our architects and engineers can muster and, it is here on this crucial testing ground, that their ideas must be examined. We prescribed a ceiling of Rs. 5,000 for the cost of construction of every house built in the Model Houses Section of the Exhibition and you will shortly be able to see and judge for yourself the thought and skill which the exhibitors from India and abroad have displayed in producing a house within that overall figure. Amongst them you will see two houses built to the designs which were adjudged as the best in the competition that was held for designs on low-cost housing. The Building Materials Section and the Building Techniques Section of the Exhibition will reveal the intricacies with which many of us may not be familiar.

The research on building materials has, of necessity, to be carried out as a continuous process. The discovery of substitutes and the adaptation of known indigenous materials to new uses has to be the goal to which our chemists and physicists have to give their undivided attention, in order to keep down the cost of construction. Similarly, the research into improved methods of construction techniques, of handling the tools and implements of construction in such a way as to

economise on both time and cost, has also to be a target of prime importance before our engineers and technicians. It is on the concerted efforts of these experts—the architect and the engineer; the chemist and the physicist; the craftsman and the master builder—the solution of the housing problem depends.

Whatever be the methods or designs that may be adopted, the building materials used must largely be of local origin if the houses are to be sufficiently cheap and within the means of most of our countrymen. Rural housing will be, as it has been, largely a matter of local effort, local materials and local techniques. The deterioration in the general standards of living has, of course, meant a certain decline in rural housing standards and our biggest housing problem today is as much in the rural areas as in the urban areas. We have put up here, at this Exhibition, a village community centre. It suggests some simple improvements which would make the village houses not only look better but also improve their utility. It also indicates a more rational lay-out of the various organs of normal village activity and I would like to specially bring this sector of the Exhibition to your notice where, incidentally, you will find what would be a source of perpetual inspiration, a replica of Mahatmaji's hut at Wardha.

May I, Sir, now request your to distribute the prizes to those who have been successful in the various designs competitions and then to declare the Exhibition open.

Address by the President, Dr. Rajendra Prasad, at the Inauguration of the International Exhibition on Low-Cost Housing, 20th January, 1954.

Your Excellencies, Ladies and Gentlemen,

I am thankful to the organizers of this International Exhibition on Low-Cost Housing for their invitation to me to inaugurate it. This exhibition, perhaps first of its kind, focuses attention on one of the most pressing problems of today, the problem of housing. There is shortage of houses everywhere. Nearly all the countries of the world today are faced with the problem of constructing more and more houses so as to improve the supply to cope with the increasing demand. A reasonably comfortable house, providing shelter against inclemencies of weather and affording room for necessary rest and leisure, is an elementary need of mankind. It is clear that if the present need is to be met to any reasonable extent, houses will have to be built on a huge scale. It is possible only if the cost of construction and the materials which go to make a house is brought down to a level where a house might come within the reach of a man of average means. It is, therefore, appropriate that this exhibition should be called an exhibition of low-cost housing.

Generally speaking, housing sounds like an abstract idea although houses are made of such substantial material as brick and mortar! I believe one great contribution of this International Exhibition will be to bring the problem of housing into the region of the concrete. The many exhibits displayed here are its unmistakable proof. You will agree that when it comes to bringing together in a practical way the existing knowledge on house building and design and to translate that knowledge into actual houses, this change in outlook would necessarily represent a great advance over the present position. This

exhibition will provide a forum to professional men to exchange ideas and to see the methods which have already passed the test or are still engaging the attention of planners, engineers and architects. To the layman for whom houses are needed this exhibition is bound to provide a goodly choice to select from. The choice will be real in so far as every house exhibited in this exhibition costs up to Rs. 5,000. Besides demonstrating the various types of houses built from different materials, this exhibition will also stimulate proper interest in housing—not in the abstract problem of housing as such which might be an alluring subject of discussion for academicians and economists, but of houses themselves, houses promising roofs on top and cosy shelter within. It is from this point of view that this exhibition is to be welcomed by all those interested in the welfare and comfort of man.

I particularly welcome the broad auspices under which this exhibition has been arranged. As the problem of housing is common to all countries, and human beings all over the world need houses to live in, it is only proper that such a venture should take the shape of an international forum for the common good of all. I am told, exhibits have come from many foreign countries, including Burma, Ceylon, Australia, Finland, Germany, Austria, Indonesia, Israel, Singapore, Thailand, Sweden, Italy, Fiji Islands and the United Kingdom. By convening an international Seminar on housing under the auspices of the United Nations Technical Administration, this exhibition has not merely added to its status but greatly widened its scope. This Seminar, in which experienced architects and engineers from good many countries are participating will discuss such important subjects as construction methods and building materials, programmes for housing and improvement, etc. This will be followed by discussions by the Inter-Secretariat Working Party of the ECAFE which is meeting in Delhi this month. As a result of all these discussions and valuable exchange of ideas, let us hope it will be

possible to pool the experiences of the participating countries and adopt models which result in bringing cheap and comfortable houses within the reach of the common people.

As I have said, house is an elementary need for man. Ever since the dawn of civilization, or may be even before that, when man like beasts of prey lived in the open, he felt the need of some kind of shelter. There was a time when the improvised shelter proffered by bushes and trees satisfied his need. In places where trees did not grow, a subterranean hide-out or a cave or the shade of any projecting cliff answered his simple requirement. As time passed and man learnt to manipulate the twigs and branches of trees, he found leafy huts rendering better service to him. Gradually he began to thatch and plaster these huts with mud. And so man went on progressing, improving upon his craftsmanship and selecting better and better building material, till he found himself capable of raising such gigantic structures as the Pyramids of Egypt. Although throughout this long stretch of time, known to us as Historic Era, man has been familiar with the art of construction and has been responsible for raising structures of all kinds and sizes, the need of the common people did not receive the attention which it deserved. It is at once the duty and the privilege of us all, living in this democratic age, to think of housing and houses in terms of the common people. Therefore, I think that this exhibition adds a new chapter to our endeavours for housing the people properly. Here you will consider houses not only from the point of view of mere living space but also in respect of design and the æsthetic aspect. As Bacon said: "Houses are built to live in, more than to look at; therefore let use be preferred before uniformity, except where both may be had". I hope that you will combine use with beauty.

Another thing in this exhibition which has specially attracted me is its Village Centre. In this Centre are exhibited houses specially useful for the Indian villagers. That a vast majority of India's population lives in villages is a fact which

needs no emphasis. Unless, therefore, we base the principles on which we are building houses on the pattern of our village life and the special requirements of the country people, our efforts in respect of providing adequate housing facilities will remain abortive. We shall have achieved a great deal if we succeed in demonstrating how a village might be replanned and how the village-folk might live in houses constructed with locally available materials with the help of their own labour at an expenditure within their means. Let me hope efforts will be made to attract people of at least neighbouring villages so that they might come and visit this exhibition.

Another important gain which I expect from this exhibition is more light on the use of various building materials available in this country. Wisely enough, you have, set apart a separate section dealing with building materials. With our limited resources in money and material, we have to go ahead with our plans to increase the national stock of housing. That is possible only if we devise ways and means of putting the easily available materials to the maximum use. Incidentally, that is also the best way of ensuring that the cost is kept as low as possible. In this direction researches have been going on for some years in the Forest Research Institute, Dehra Dun, and the Indian Institute of Technology, Kharagpur. The Indian Council of Scientific and Industrial Research has recently opened for this purpose the Central Building Research Institute at Roorkee, where all these researches will now be co-ordinated and centralized and turned to practical use. All this points to the necessity of discovering cheaper building materials and evolving new building techniques so that the materials locally available are put to the best possible use and shortage of any particular material is not allowed to hamper our building programme. Besides, use of locally available material not only saves cost of transport but also reduces the pressure on our transport system. When considering the utility of local

materials, we should also bear in mind that all our old buildings and structures that have stood the strain of time and successfully resisted the inclemencies of weather in this country of varied and varying climatic conditions, were made with those materials and some of them at least are even now available.

People of this country, where in some places the shortage of housing is somewhat acute, will be looking forward with eagerness to the outcome of this exhibition and your deliberations. Let me hope as a result of your efforts house-building receives the much-needed incentive and more people are able to own, or at least plan, their own houses.

I wish this unique venture all success and have great pleasure in declaring the Exhibition open.

Exhibition Round-up

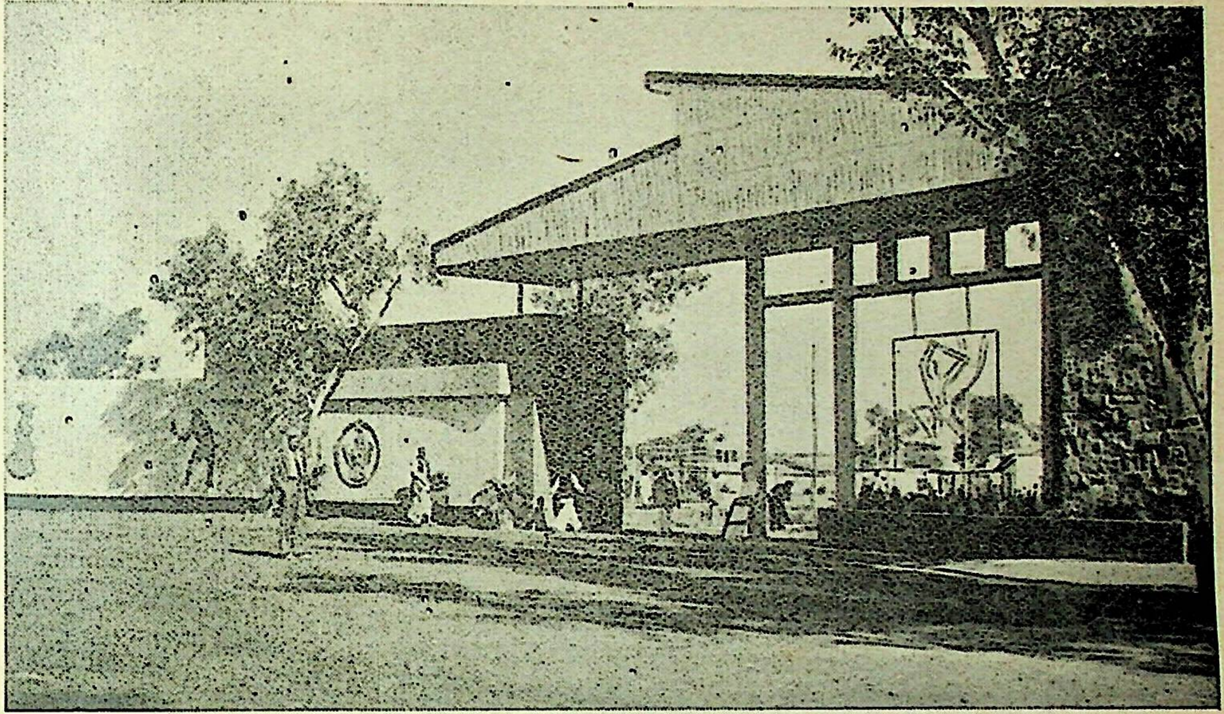
EXHIBITION ROUND-UP

At the foot of Purana Qila on the Mathura Road you will see a big gate, simple but symbolic of the spirit which the International Exhibition on Low-cost Housing represents. This entrance to the Exhibition is analytical in design and has been constructed by bringing together textures of various materials and structural techniques actually applied in setting up the museum on Low-cost Model Houses. Decorated with simple dignity, the gate welcomes you to the Exhibition. Two sides of the gate have curved walls which have been set with murals and sculptures in relief. The main theme of the mural paintings is the evolutionary process through which the techniques of building construction has passed and developed. On the other wing of the gate you will see seven murals showing modern building technique in practice both in India and other parts of the globe. Both wings of the gate are adorned with relief figures in cut brick. These figures depict the workers who have for centuries worked to bring the building technique to its present high level.

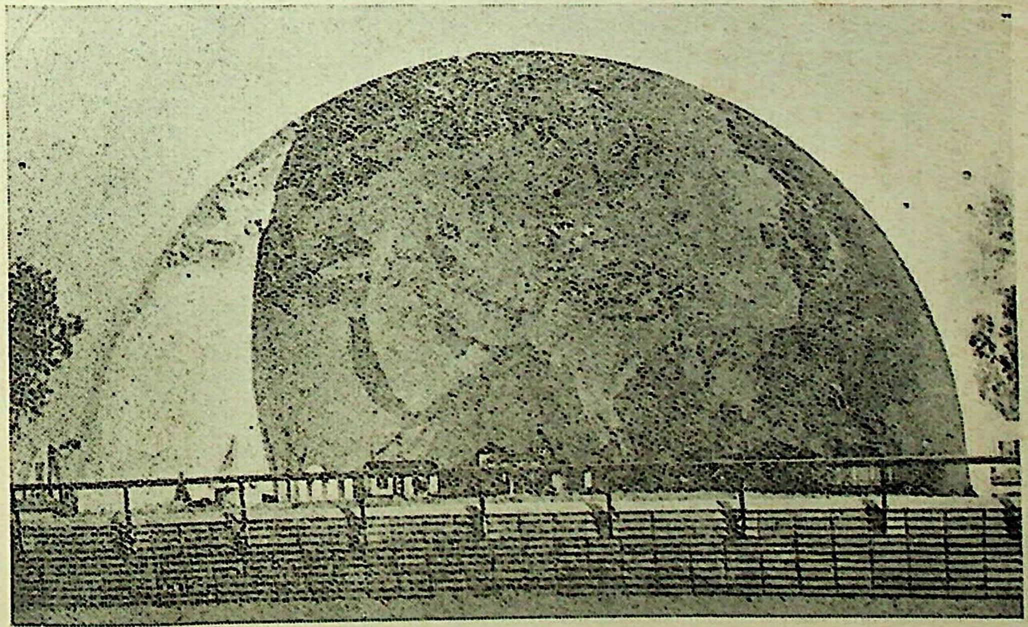
As you enter the gate you are attracted by what looks like a half moon and if you happen to be visiting the Exhibition at night the illusion is complete. This feature of the Exhibition is a reinforced concrete shell, the inside of which reveals a spectacle in the form of a lay-out of a village exhibiting several types of model houses from different countries. On the outside surface of the shell you see a relief map of the world.

Right behind this shell and on either sides you see a cluster of houses and you are amazed at the wide variety of designs that unfolds before your eyes. You see houses built with circular roofs, sloping and flat roofs; some as low as eight and a half feet, others rising high upto thirteen feet or more. You see various types of building materials which are being used not only in India but in other countries also. From mud plaster, dried brick and wooden poles, human ingenuity brings to light new techniques of building and designs.

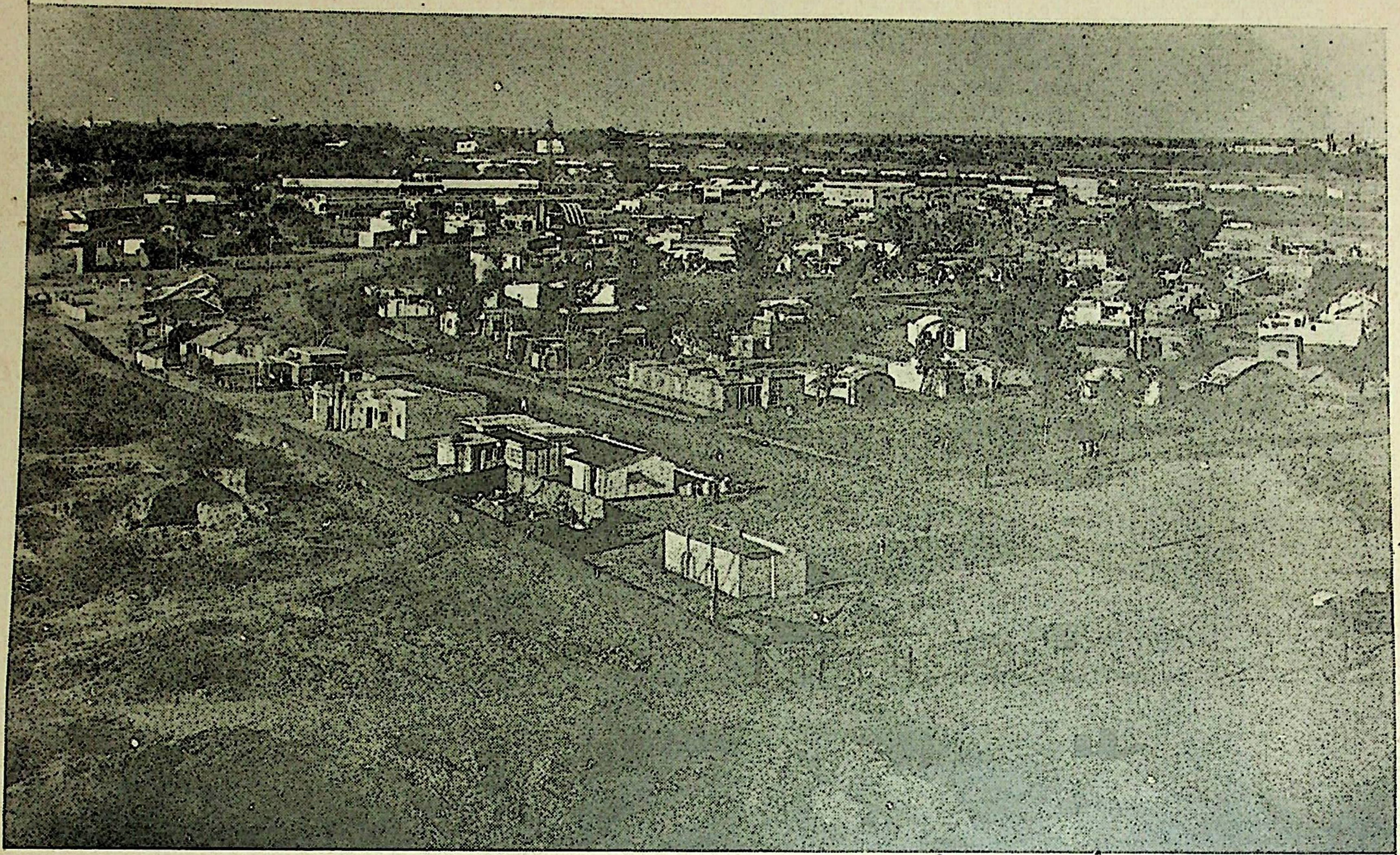
With these reflections in your mind, you turn to the left of the shell and see in front of you stretched out in the form of a semi-circle a group of eleven houses built in different designs and to various specifications. You are now about to enter what is called the Model Houses Section of the Exhibition, where no house costs more than Rs. 5,000. It is laid out in a rough circular shape and includes houses put up by the various States in India, private individuals, firms and agencies and by authorities from outside India. You will see here two Model Houses built to the designs of the persons who have won the President of India's Gold Awards for the best design on low-cost housing. But let us go about this section of the Exhibition in a systematic manner.



MAIN EXHIBITION GATE



A CENTRAL FEATURE OF THE EXHIBITION



A GENERAL VIEW OF THE EXHIBITION

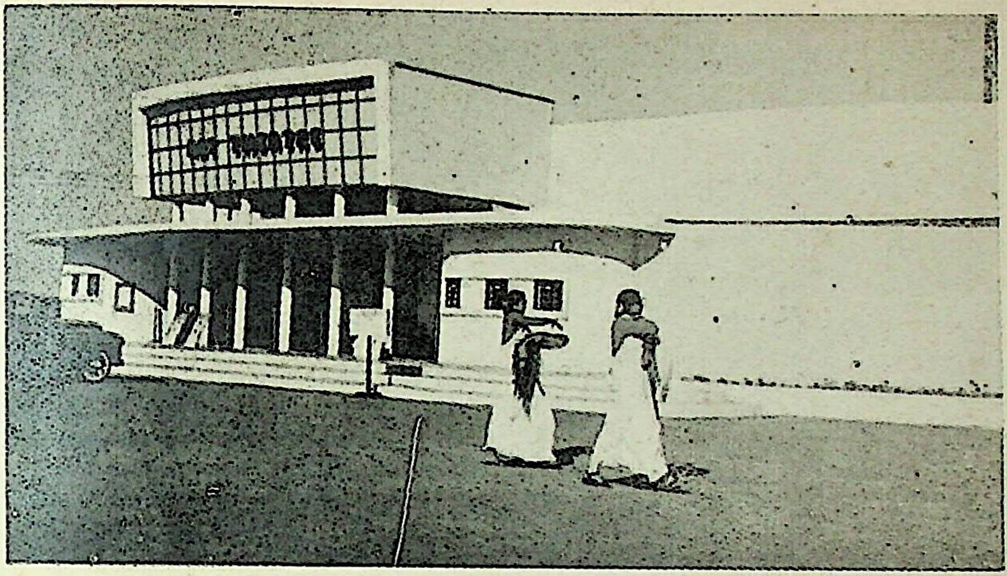
THE MODEL HOUSES SECTION

You will first come to the houses of different designs built by the C.P.W.D. and then to the shell houses which the Building Research Institute, Roorkee, have set up. The house built on plot No. 5 has been constructed by the U.P. Government and depicts the style most popular in that State. At this stage you will see a *kucha-pucca* house and further on a cluster of structures which are distinctly rural in character. Let us leave this rural centre alone at this stage and proceed on with the Model Houses Section of the Exhibition. Skirting round the rural structures, which are on a lower elevation, you walk along the main vista facing south and see on your right Model Houses constructed by Hyderabad City Improvement Trust, Madhya Bharat Sanitary Engineering Department and two houses set up by the Railways. Here you are attracted by the white hollow blocks of the house constructed by the Bikaner Gypsums. Gypsum you are told is resistant to fire dangers. The special feature of the house constructed by the Hyderabad Government is the Goona tiles used for its roofing. The railway quarters have been built in traditional style with locally available materials. You now enter a lane and see Model Houses on both sides. The Delhi Improvement Trust, the Military Engineering Service, Asbestos Cement Co., the Governments of PEPSU and Bihar and the Bombay Housing Board have set up their houses here. On your left, there are houses built on plots No. 21, 22, 23, 24, 25 by the Northern Railway, C.P.W.D., Chandigarh and the Saurashtra Governments respectively. Situated just opposite these houses is another group built on plots No. 16, 17, 18; C.P.W.D. Model Houses No. 1, 2 and houses set up by the States of Hyderabad, Uttar Pradesh, West Bengal, M.E.S. and the Asbestos Cement. You have now entered a slightly wider road and stand facing west and can see from here the Exhibition site. On this main road you have more than thirty houses with varieties of designs, plans, styles and technique. Here you will have the opportunity of seeing the constructional technique adopted in Assam, Madhya Pradesh, Andamans, and Bhopal. You will be attracted by the houses set up by the Forest Research Institute, Dehra Dun, the Delhi Land Finance, the Aluminium Co. Ltd., the Hindustan Block Manufacturing Co., and the All India Housing Association. Amongst these, you will find a house not very high but having its constituents in the form of as many as 15 frames which can be dismantled for transporting the house from one place to another. The house is named *Mata Gore*. Behind you now is another line of Model Houses built in plots No. 49, 50, 51, 53 and 54. Here amongst other constructions, you will notice a concrete house built by the Millar Trading Co., using a modern technique known as the vacuum concrete process.

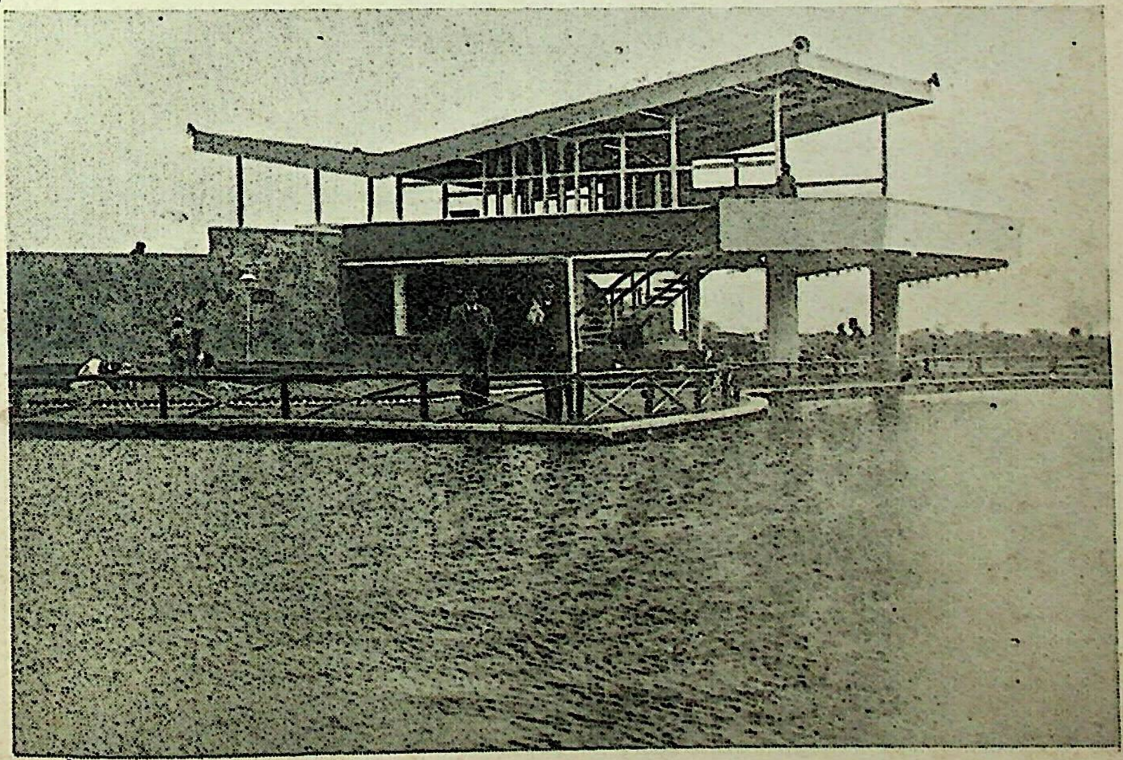
Adjoining this house is a charming house of stone built by the Government of Rajasthan. The low-cost technique of hollow walls and A.C. sheet roofing, you will notice, has been adopted in the house built by Mr. Mehta.

The Rural Centre.—Let us now visit the rural structures which we left behind. These structures are on the outer periphery of the Model Houses Section, directly behind the reinforced concrete shell. Facing towards the east, you find in front a group of buildings built in traditional style with *kucha-pucca* bricks and timber on a sandy and dusty area. This group has been named as the Village Community Centre. Real India lives in villages and the problem of good housing in rural areas is a vast one. The Community Development Projects are a first organised step to plan village life and living conditions. The Community Centre in the Exhibition presents a model village built with materials and labour locally available. As you see the village, you think of Mahatma Gandhi, Father of the Nation. The Rural Section would have been incomplete without a symbol of the ideas which he represented and which guide us today. On your left, in the Community Centre, you will find a replica of his hut at Wardha. All the buildings in the Centre have been fitted with proper lighting and ventilation, and are provided with adequate facilities for drinking water and drainage. In this village you see the school building, which is at the same time a community centre and a place where the *Panchayat* can hold its meetings. You find a health clinic and across the central open space, you have the Community Grain Store with an adjoning hall where a Co-operative Store can function. You will also find small shops where the potter, the smith, the carpenter and weaver are engaged in their respective trades. The improvised stage in the Community Centre, is the focus of village gaiety and festivity, but standing as a reminder, as it were, to the essential poverty of the village, you will see near the replica of Gandhiji's hut, a house which a family of two persons with an income of Rs. 500 per annum can construct. The 'Growing House' as it is called, built of *pucca* and *kucha* bricks costs Rs. 440 only. It has been so designed that additional accommodation can gradually be provided with an increase in the family and the standard of living. An additional room in this house will not cost much. The house accommodation can be further extended and improved without impairing the earlier *pucca* construction in any manner. If you are still curious to know details about the house, you will be told that the *kucha* portions can be replaced any time without damaging the other portions of the building. The exterior of the house is colourful, with ventilators and a pattern of red and *kucha* bricks. An iceless refrigerator and a window closure which serves as a table are also provided in this house.

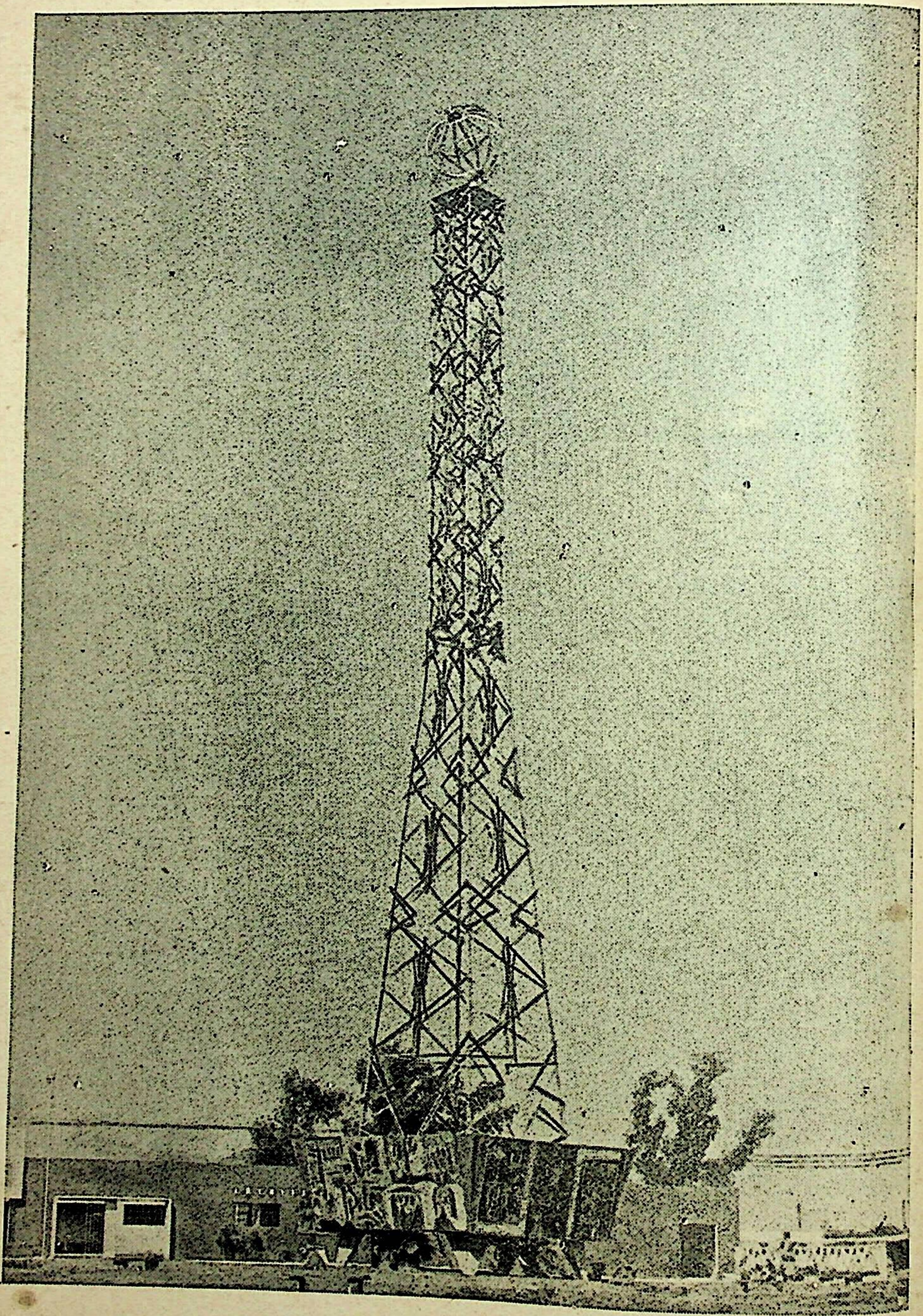
On the left of the Community Centre you will see a group of huts built in mud and bamboo with thatched roofing. This group of mud huts has been set up by West Bengal Government and the Industrial Workers Engineering College, Calcutta. The group includes a temple known as *Chandi Mundap* and paddy store. All these have been constructed in traditional style and with the materials easily available in West Bengal. Further ahead you will find life-size house constructed by Rational Planning Corporation, Bombay and a delightful bamboo house built in traditional



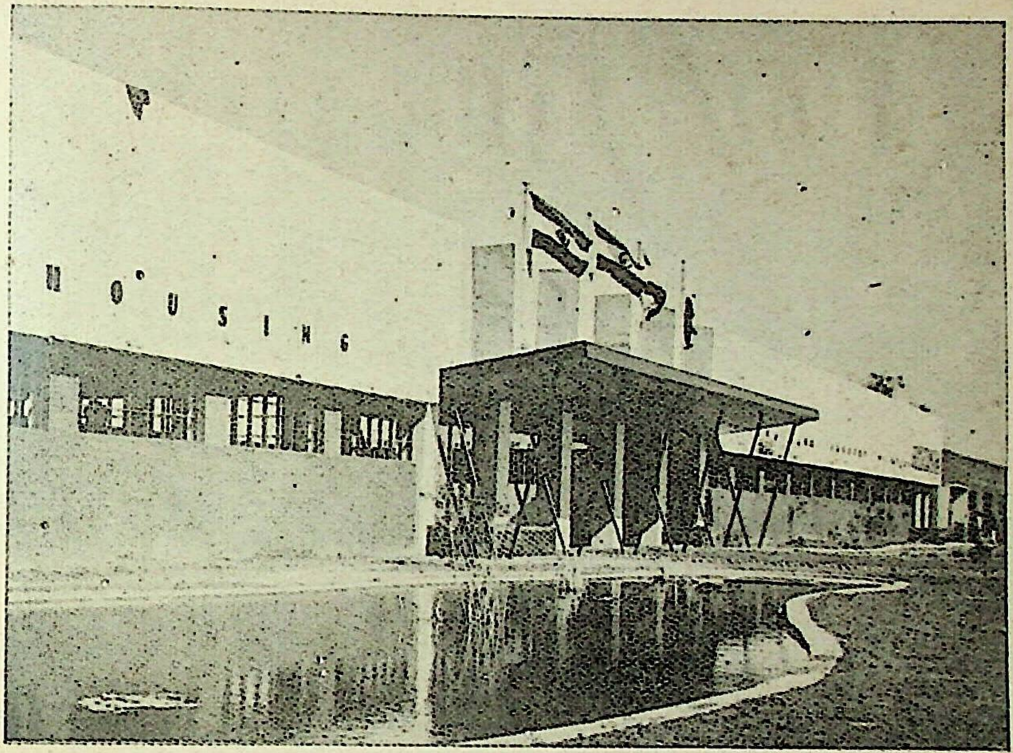
THE ART THEATRE



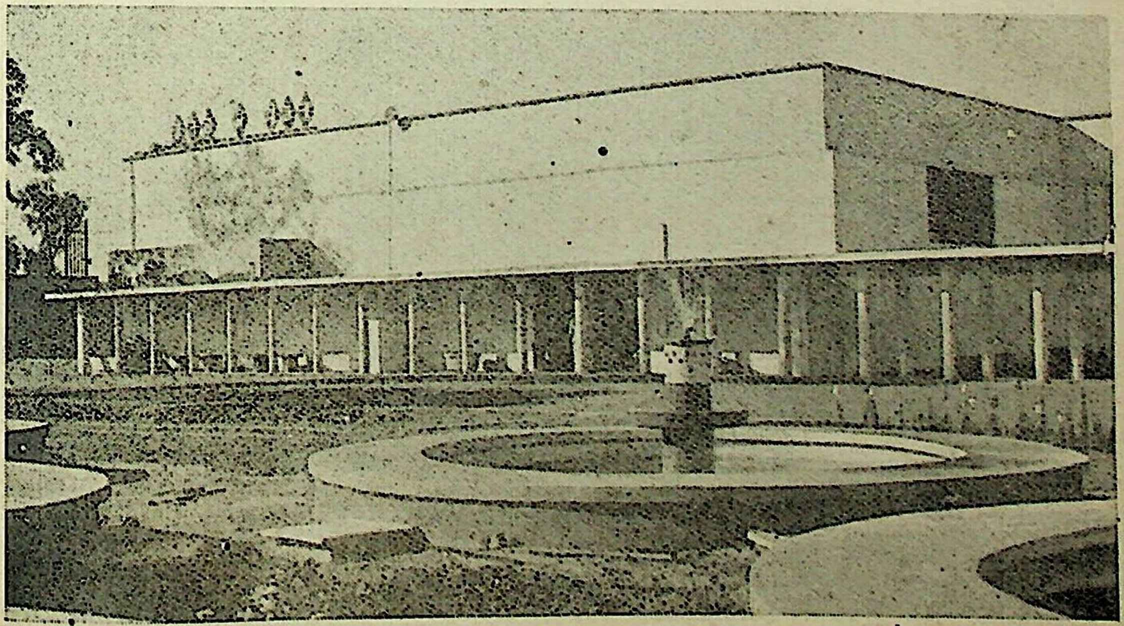
THE BOAT RESTAURANT



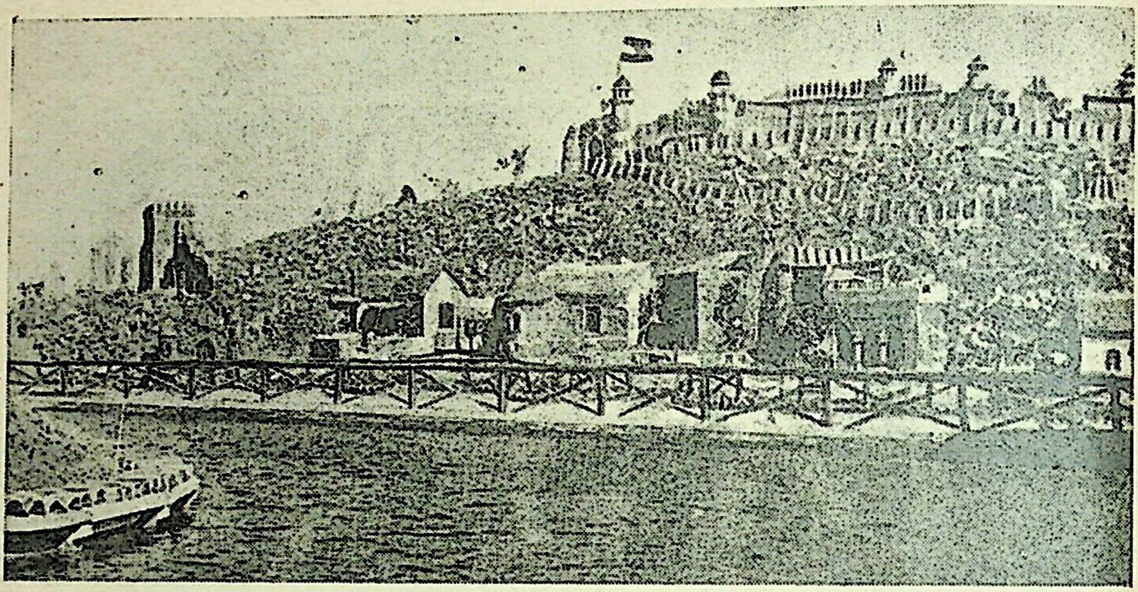
THE PYLON



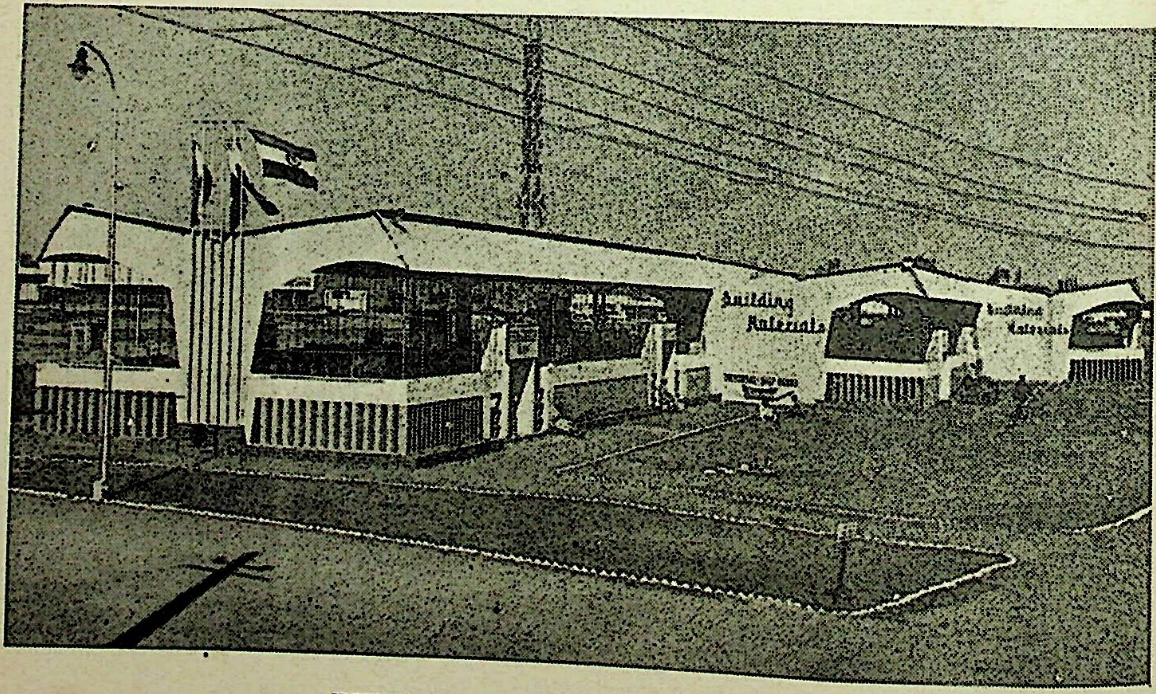
EDUCATIVE MODEL SECTION



PLANNING COMMISSION AND OTHER EXHIBITS



THE TOY-TOWN



BUILDING MATERIALS SECTION

style by the Burma Government from material brought all the way from Burma.

If you are an engineer or an architect, you will describe this vast area of the Model Houses Section and the Rural Centre as a laboratory of new ideas and a storehouse of knowledge. If a social worker, you will perhaps think of these houses in the context to the housing and slum problem, which faces all of us today. If your means are limited, you will have the opportunity of selecting a house with a suitable design which you can afford to build or buy.

THE ENTERTAINMENT CENTRE

You have now covered a very wide area and, if you want to relax, you have just entered that section of the exhibition where you can do so at your leisure. May we recommend that you cross that wooden bridge over the Serpentine and step into the fairy land of turrets and towers, of moats and draw-bridges—a miniature toy-town, in fact, which nestles at the foot of a hill and under the shadows of that ancient fort's walls. You will see here a small grocery shop, a *panchayat ghar*, the village well, the thatched roofs, the antelope and the barking dear, the *nilgai* and to red-headed crane—in fact, a child's dream come true. Across this lake, is the Boat Club Restaurant; you can rest here, shake the dust off your feet and gaze upon the globe-topped pylon before you. The children can in the meantime have a fling at the Amusement Park, and ride the giant wheel and the dodgem cars, or hire a *shikara* or a *gondola* and row on the Serpentine that winds itself around those two islands. If, however, the children are precocious and have a serious streak in their make-up, you might find yourself in the Open-air Theatre. You will not regret having got there, for on this stage, on almost every evening, you will be able to see some of the best that there is on Indian music, dance and drama. Close by to the Theatre, there is a Cafeteria which we would unreservedly recommend for your consideration.

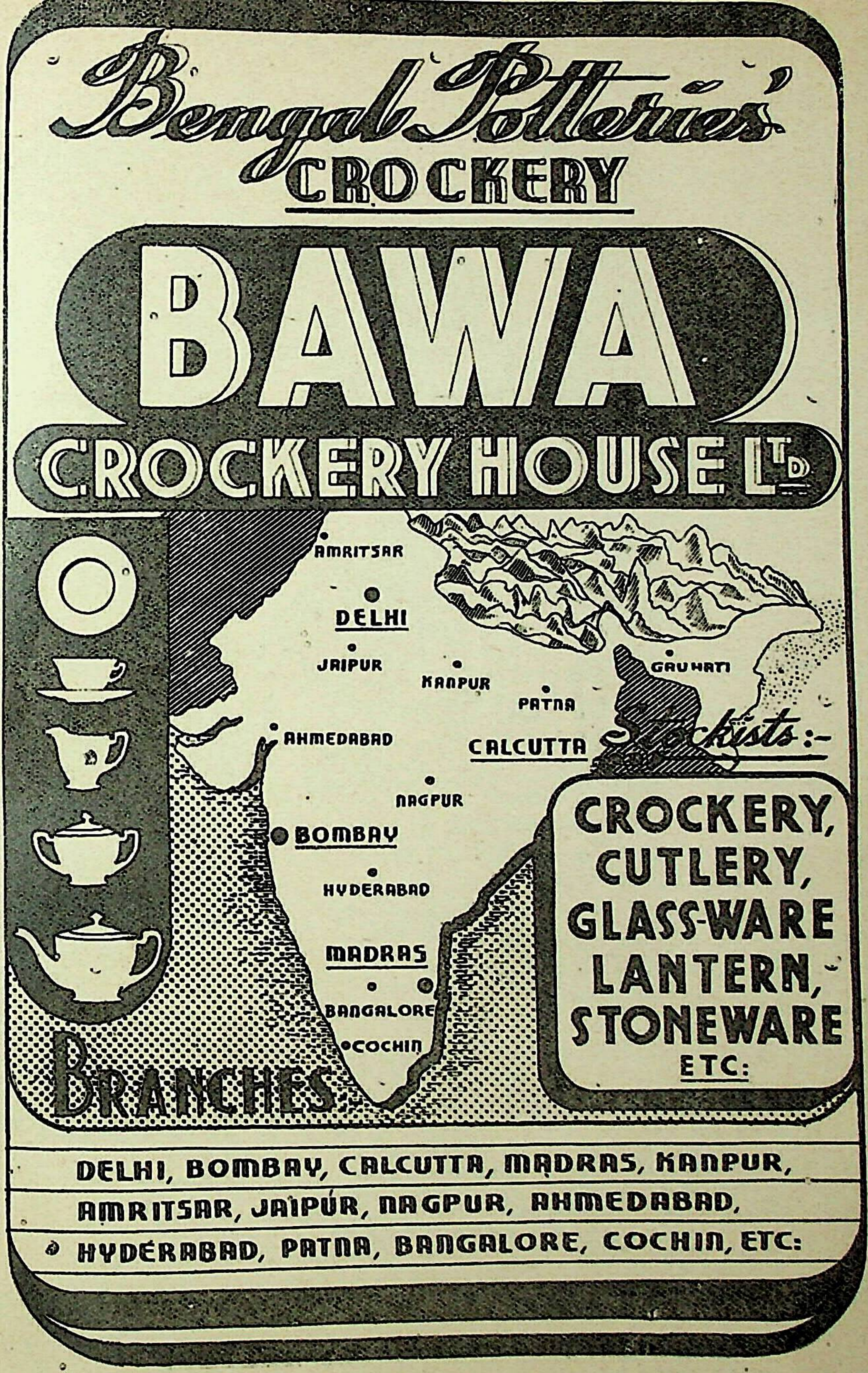
THE EDUCATIVE MODEL SECTIONS

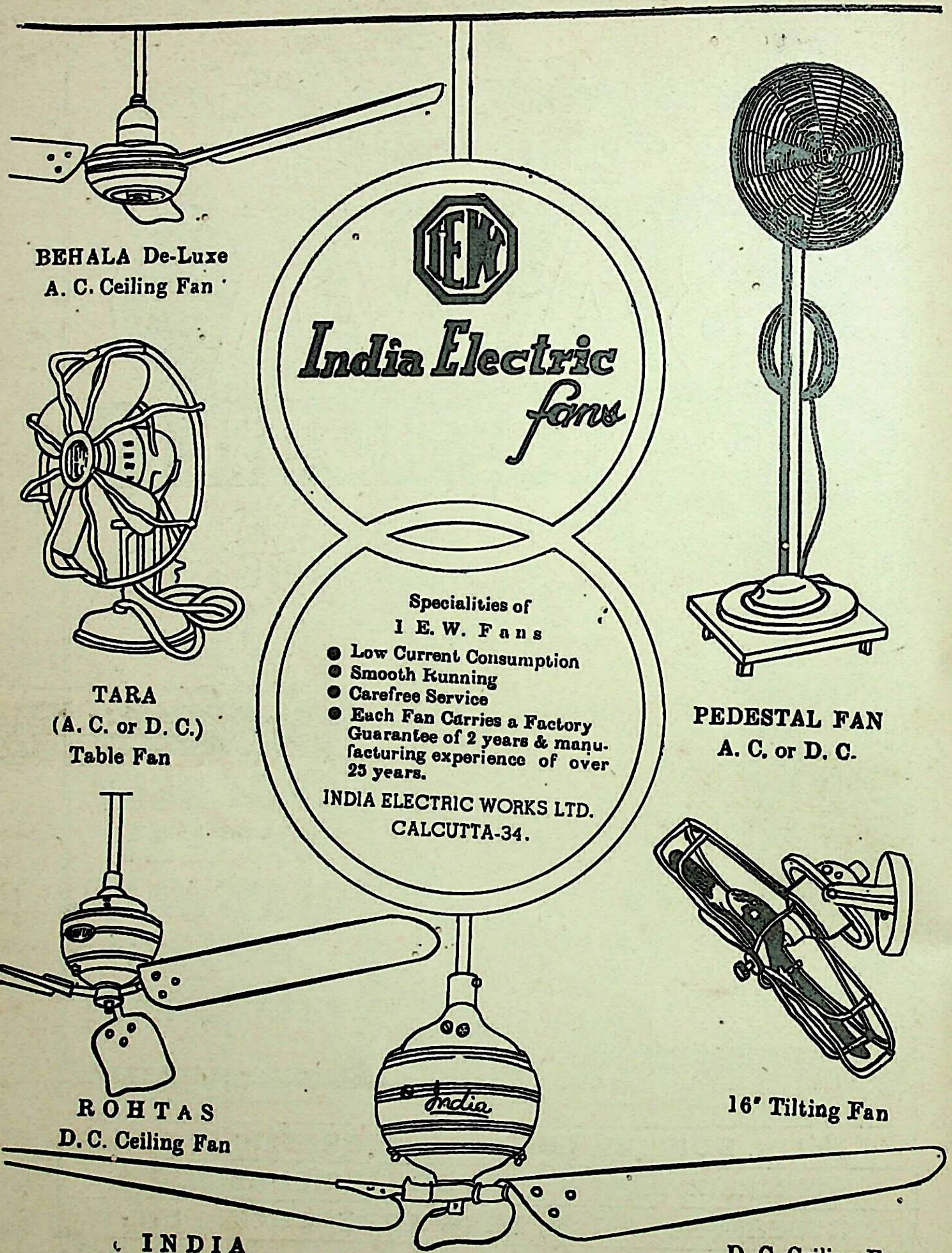
It is time now that we continue our visit round the Exhibition. Just opposite the Serpentine you will notice a big stall with a zig-zag roof which houses the Building Materials Section of the Exhibition and, in the space just adjacent to it, the Construction Techniques Section of the Exhibition. How many of us know the building materials which go into the making of a house and of the techniques employed in actual construction. The Sections provide you the answers, tell you what to avoid and what to adopt in the construction of a house. Here you will see new building materials, new techniques and ideas which are being tried out in India and abroad. Ask the attendants to explain to you economy that is implicit in the various materials and techniques that you see: you will realise then the amount of thinking which goes into the construction of a house.

Behind the pylon and stretched out in front of you, you will see a big hall which houses hundred of diagrams, models, drawings and charts received from abroad and from the States of India—all on the subject of low-cost housing. A visit to this hall could alone take a day, for here you have on view exhibits from Austria, Australia and Burma; British Guiana, Ceylon and Dares-Sallam; Finland, Fiji Islands and Germany; Indonesia, Israel and Italy; Kenya, Puerto Rico and Singapore; Sweden, Thailand and the United Kingdom: from India itself, apart from the contributions of the various State Governments, you will see exhibits of the Central Building Research Institute, Roorkee; of the Forest Research Institute, Dehra Dun; of the Indian Institute of Technology, Kharagpur; the Northern Railway, the C.P.W.D., the Military Engineering Service and the Delhi Polytechnic.

In the other hall, near the Open Air Theatre, you will see the Domestic Services Section and in the hall opposite, the Light and Heavy Machinery used for construction purposes.

We hesitate to say good-bye, for we know that you will come again to see this Exhibition. We will now let you roam unattended and to find out for yourself the things that we have not been able to describe in the space of this article.


Bengal Potteries'
CROCKERY
BAWA
CROCKERY HOUSE LTD
AMRITSAR
DELHI
JAIPUR
KANPUR
GAUHATI
PATNA
AHMEDABAD
CALCUTTA
Stockists:-
NAGPUR
BOMBAY
HYDERABAD
MADRAS
BANGALORE
COCHIN
BRANCHES
CROCKERY,
CUTLERY,
GLASS-WARE
LANTERN,
STONEWARE
ETC:
DELHI, BOMBAY, CALCUTTA, MADRAS, KANPUR,
AMRITSAR, JAIPUR, NAGPUR, AHMEDABAD,
HYDERABAD, PATNA, BANGALORE, COCHIN, ETC:


IEW
India Electric
fans
BEHALA De-Luxe
A. C. Ceiling Fan
TARA
(A. C. or D. C.)
Table Fan
Specialities of
I E. W. Fans
Low Current Consumption
Smooth Running
Carefree Service
Each Fan Carries a Factory Guarantee of 2 years & manufacturing experience of over 25 years.
INDIA ELECTRIC WORKS LTD.
CALCUTTA-34.
PEDESTAL FAN
A. C. or D. C.
ROHTAS
D. C. Ceiling Fan
16" Tilting Fan
India
INDIA
D. C. Ceiling Fan


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To function efficiently, our mechanized world looks to its suppliers for ever-increasing amounts of petroleum products which maintain sea, air and highway transport systems and keep production lines rolling. Caltex fuels, oils and lubricants contribute to the prosperity and well-being of free peoples in 67 lands.
CALTEX
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VILLAGE CENTRE

Presented by

The Technical Assistance Administration of the

United Nations

and

The Community Project Administration

(Planning Commission)

With the co-operation of

International Labour Organization.
Food and Agriculture Organization of the United Nations.
World Health Organization.
United Nations Educational, Scientific and Cultural Organization
United Nations International Children's Emergency Fund.
Jamia Milia University.
Indian Co-operative Union.

COMMUNITY PROJECTS AND VILLAGE HOUSING

India is a land of villages. According to the last Census Report, out of the total Indian population of 356,879,394 nearly 295,004,271 live in about 558,089 villages.

The Indian village has on an average a population of about 500 persons distributed in about 100 families. While the majority of the villagers are agriculturists, there is a fair sprinkling of artisans, traders, and other workers.

The policy of the rural housing which is being evolved in the Community Projects is based on the following fundamental principles:

(1) the house shall be constructed of materials which are locally available;

(2) the capital cost of the house shall be within the means of an average farmer; who might obtain a loan, if necessary, under a scheme of aided self-help;

(3) the house shall have proper lighting and ventilation; a suitable floor higher than the street level; a clean washable surface for kitchen and proper drainage arrangements; it shall be provided with a leak-proof roof and a proper cattle shed in the yard;

(4) the house shall have adequate free space around.

An ideal Indian village will have protected surface wells or tube-wells for drinking water, adequate facilities for drainage, an agricultural extension service, and veterinary and sanitary services.

"First plan the community, then the house" is an ancient saying. The success of the community development is based entirely on the development of the individual. And the life of the individual is conditioned by the local environment. One of the objectives of community development is to provide for the individual a home built for a healthful and happy life, as part of a community plan for living, with schools, hospitals, shops, parks and places of recreation, culture and workshop.

THE EXHIBITION VILLAGE CENTRE

The village of India have a long tradition of independence and self-government—a tradition that is now acquiring new meaning with the revival of the Panchayats and the spread of Community Projects.

At the Exhibition a *Village Centre* has been set up, around which are grouped the institutions which form village life and opinion.

First, there is the *school building* which is, at the same time, a *community centre* and place where the *Panchayat* can meet and keep its records. The school itself is designed as a *basic school* of 5 classes based on teaching through gardening.

Then there is a small *health clinic* where first aid treatment is available normal medical examinations are done and medicines dispensed.

Around the *Village Centre* are shown two wells, a tube-well from which water is pumped by a small engine to supply community showers, a drinking water tap and a community wash place and a dug well with a hand pump for general purposes. There is also a cattle shed, trench, latrine and compost pit on the Sevagram model approved by Gandhiji. These have been located with a view to improving the sanitation of the village.

In addition there is a plant that produces out of cow-dung gas for lighting and cooking and still leaves a good manure to fertilize the kitchen garden.

Across the central open space are several village craftsman who are each displaying their skill in an aspect of their work that is closely related to housing. First there is the *potter*, then the *smith*, then the *carpenter* and finally the *weaver*.

A community *grain store* has also been shown. In the hall adjoining it, a co-operative shop can function. Nearby is a *ghani*. All these enterprises can be run together by a village multi-purpose co-operative.

There is one aspect of the village life which cannot be forgotten: a place with a stage for the traditional gaiety and festivities of the people. This has been erected on the wide open space commanding the view of all visitors.

THE EDUCATION CENTRE

The school house in a village is the centre for all educational and training programmes. The school shown in the Exhibition has been designed as a basic school, centred upon horticulture, for up to 100 students between the ages of 6 and 10 years in five classes. There are 2 rooms and 3 verandahs to hold the classes, and a small green plot for gardening and nature study.

Outside of the normal school hours an overall programme of social education suitable separately for men and women can be conducted in the school premises. Group instruction in any form of co-operative activity can also be arranged in the school rooms.

The Panchayat office and the School office are in the same building to ensure close collaboration between these two important institutions of the village.

The school house has been constructed and equipped with an eye to the following three functions:

(1) Basic education for children, (It has facilities for imparting instruction in arts, crafts, general science, and field practices in farming).

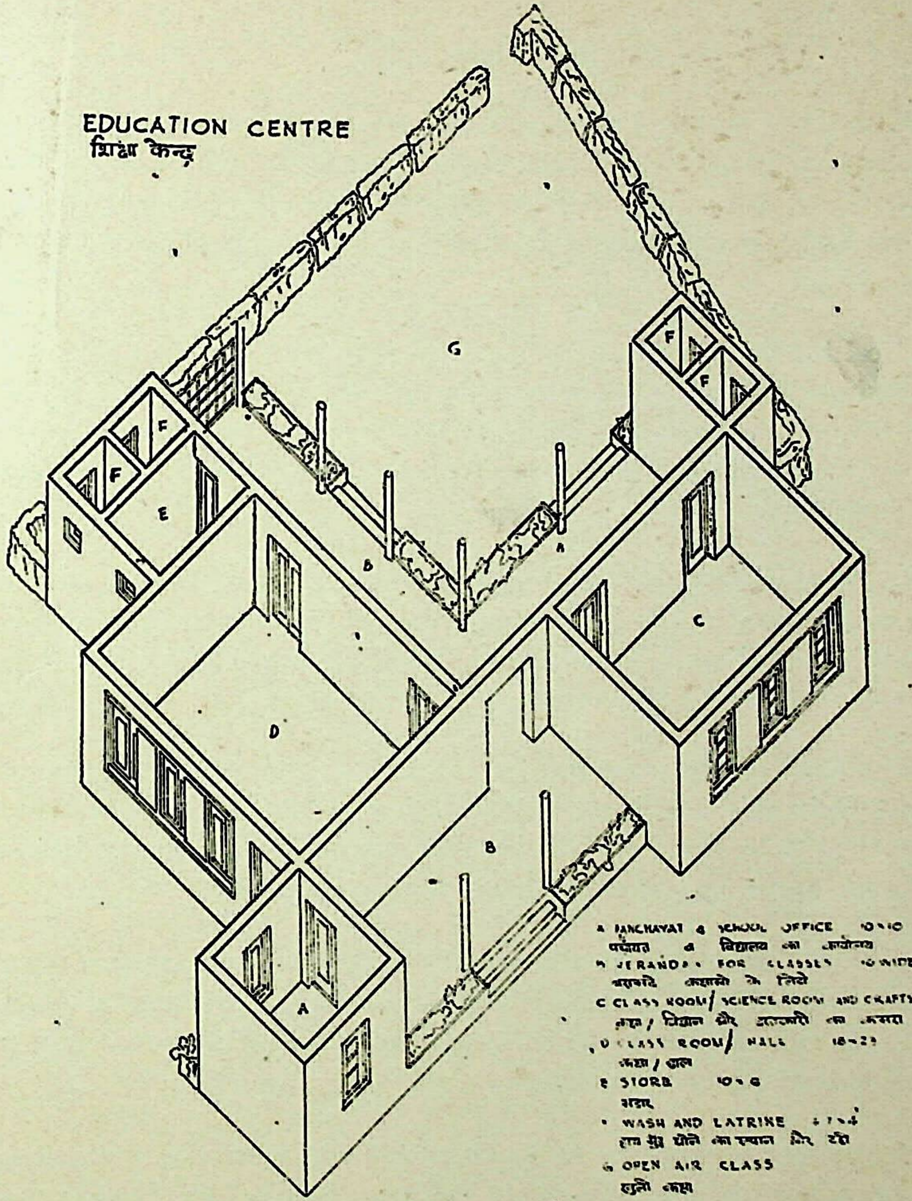
(2) Fundamental Education or Social Education for men and women. (The essential features are a mobile circulating library for the literate, the neo-literate and the school children; dramas, recitals from holy books, group discussions and other means of joint activity, for learning and recreation).

(3) Archives of the Panchayat. (Besides keeping the records, this room will contain a community radio receiving set).

The teachers of the school will be responsible for carrying out all the educational programmes for the village. There will be both men and women teachers, and the village basic school will be co-educational.

The furniture and the equipment demonstrated in the school building are designed to suit the conditions and the economy of the village.

In addition to the school building, an open air theatre stage has been constructed. Any wide white-washed wall can be used for film shows or magic lantern slides.



Plinth Area—1,848 Sq. Ft.

	Item	Quantity	Labour
1.	Bricks . . .	4 32,000	4 Masons for 30 days
2.	Sand . . .	4 120 c. ft.	4 Masons for 30 days
3.	Cement . . .	4 1½ ton	4 Carpenters for 15 days
4.	Country tiles — .	13,000	Unskilled labour 4 men for 30 days
5.	Ballies . . .		-- 4 women for 30 days
		sizes 640 r. ft.	
6.	Timber . . .	48 c. ft.	
7.	Bamboos . . .	22 Nos.	

THE HEALTH CLINIC

The status of health of the people is a measure of the country's human resources that produce food, operate industries and perform other services. Poor health not only takes workers from the fields and other places of employment but it also greatly burdens the family income and brings suffering and sadness.

A Health Clinic completely equipped has been put up at the Exhibition. This has been designed to demonstrate the first step of a country-wide health service that will normally be available to a village. The building has a waiting room, rooms for examination and dressing separately for men and women and a dispensary.

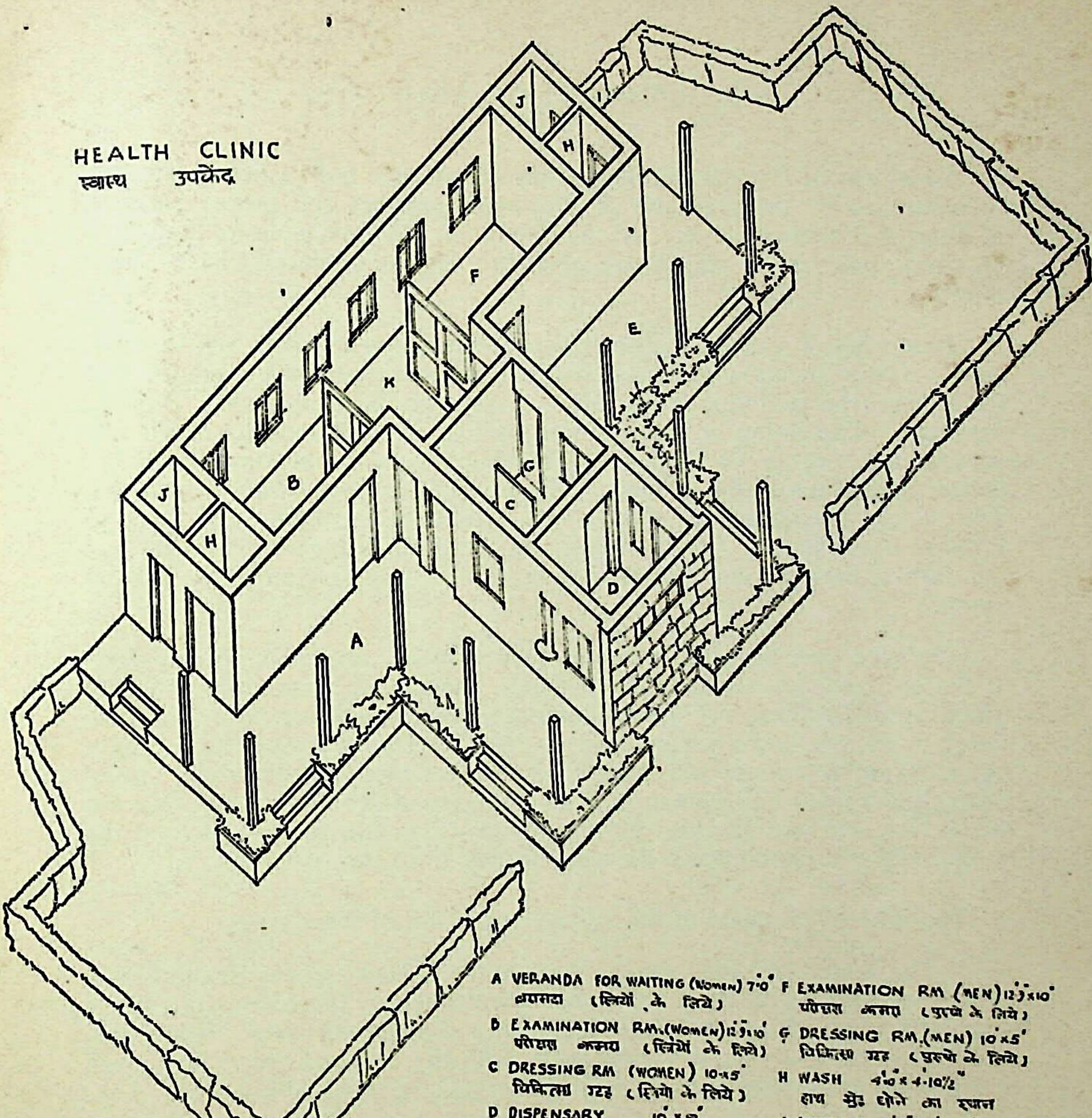
The Clinic will provide the preliminary medical amenities and nursing service to men, women and children alike, as well as act as a centre for preventive services. It has a nurse-midwife, but it is better to have a nurse and a mid-wife with possible help of one or two attendants.

Each Clinic will be supervised by a Health Centre serving a group of villages. From this Centre a qualified medical doctor will pay periodical visits to the Clinic and there will be arrangements to send to the Health Centre cases of serious illness and injury for hospitalization.

The normal functions of the Clinic are: maternity and child welfare work including normal delivery at home, first aid treatment and treatment of minor ailments, reporting of deaths and births and prevention of epidemic diseases including vaccination and inoculation.

The Clinic will generally be responsible for health promotion and undertake health education programmes. In the waiting hall of the building the organisation of the health services for India has been shown in a series of charts.

HEALTH CLINIC
स्वास्थ उपकेंद्र



A VERANDA FOR WAITING (WOMEN) 7'-0"
बरामदा (स्त्रियों के लिये)

B EXAMINATION RM. (WOMEN) 12'-9"×10'
परीक्षा कमरा (स्त्रियों के लिये)

C DRESSING RM (WOMEN) 10'×5'
चिकित्सा गृह (स्त्रियों के लिये)

D DISPENSARY 10'×8'
औषधालय

E VERANDA FOR WAITING (MEN) 7'-0
बरामदा (पुरुषों के लिये)

F EXAMINATION RM (MEN) 12'-3"×10'
परीक्षा कमरा (पुरुषों के लिये)

G DRESSING RM. (MEN) 10'×5'
चिकित्सा गृह (पुरुषों के लिये)

H WASH 4'-0"×4'-10½"
हाथ मुंह धोने का स्थान

J LATRINE 4'-0"×4'-10½"
टट्टी

K OFFICE 13'-6"×10'-0"
कार्यालय

Plinth Area—1,780 Sq. Ft.

	Item	Quantity	Labour
1.	Bricks . . .	34,000	4 Masons for 30 days
2.	Sand	170 c. ft.	4 Masons for 4 days
3.	Cement . . .	1½ tons	6 Carpenters for 9 days
4.	Country tiles . .	10,000	Unskilled Labour 4 men for 30 days
			" 4 women for 30 days
5.	Ballies of sizes . .	100 n. ft.	
6.	Timber . . .	56 c. ft.	
7.	Bamboos . . .	25 score	
8.	Local stone for masonry	100 c. ft.	

ENVIRONMENTAL SANITATION

A majority of diseases and deaths now occurring in India can be prevented or controlled by the provision of pure water supplies and proper methods of disposal of human wastes. At the Exhibition a few examples of models of approved practices in this phase of environmental sanitation have been shown.

Two types of well have been shown; the common dug well and the tube well. Their location has been fixed at the minimum sage distance (50 feet) from the pollution from latrines, barn yards and other surface drainage. The lining of the common well is of stone mortar, which will prevent the seepage of liquids. The lining must be at least six inches above the surface of the ground. The well has a cover which is essential. The widely prevalent idea that a well should be ventilated and open to sunlight is erroneous. The curbing and the ground have been sloped and the curbing has a water-diverting drain. This well is worked by a hand pump.

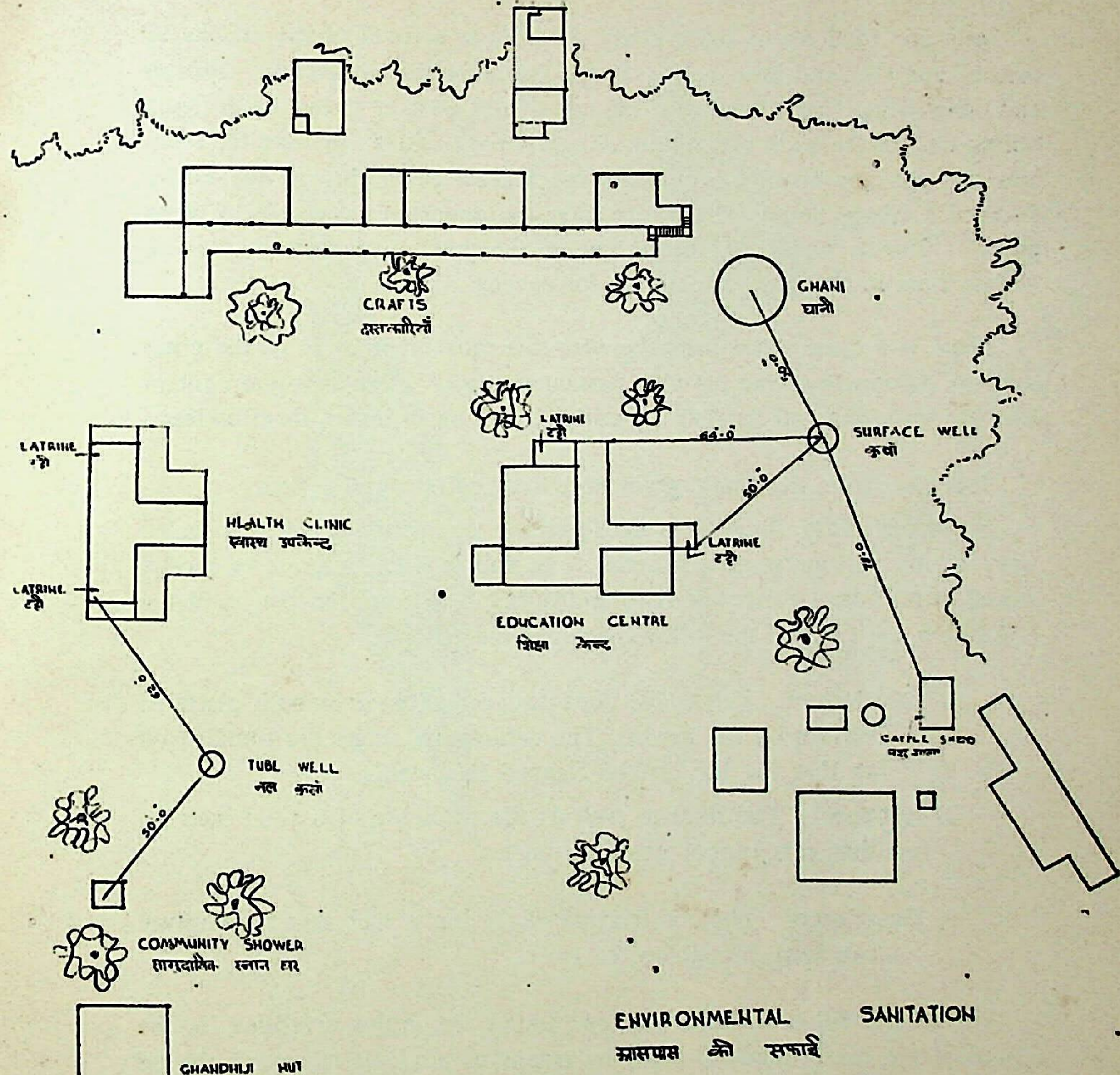
The tube well also has a casing from 6 inches above the ground level to the rock or clay strata. The casing makes a water-tight channel which guards against any possible seepage from the ground drainage. The casing is of standard wrought iron or steel. The water is pumped by a small oil engine to an over head tank 50 feet away under some trees. There the women can gather to draw drinking water as well as to wash themselves and their clothes, for the soiled water that soaks back into the ground will not contaminate the pure supply from the tube well.

The latrines provided at the village centre are of three types

1. The Water Seal Pit Latrine set up at the School and the Health Clinic consists of a pit, 8 feet deep and about 4 feet square. Placed over the pit is a squatting slab of concrete, provided with a simple water seal. The water used for washing is generally enough to flush the contents over. The layer of water left in the trap acts as a seal against odours, flies and insect breeding.

2. The Bore Hole latrine shown at the Rammed Earth House is designed to further reduce the costs in construction. It consists of a hole 20 feet in depth and 16 inches in diameter. The squatting slab provided here has no water seal and it is therefore possible for flies and mosquitos to breed in the hole-contents. The super-structure here is merely to provide privacy and may be constructed of mud or any indigenous materials.

3. The moveable trench latrine advocated by Gandhiji is the cheapest of all but needs care and attention.



ENVIRONMENTAL SANITATION
आसपास की सफाई

Seed and food grains suffer heavy damage on account of the attacks of insects and rats and also due to damp conditions during storage. Weevil and other store insects live inside the cracks and crevices in the walls, floor, ceiling etc., of the grain bins and in old grain bags. Rats can enter the seed-bins through any opening and these also burrow easily through the *kucha* floor of a village house. Thus rats make the grainstore accessible to other pests. Insects attack the germ part of the grain, and destroys the life within them so that they are useless for sowing.

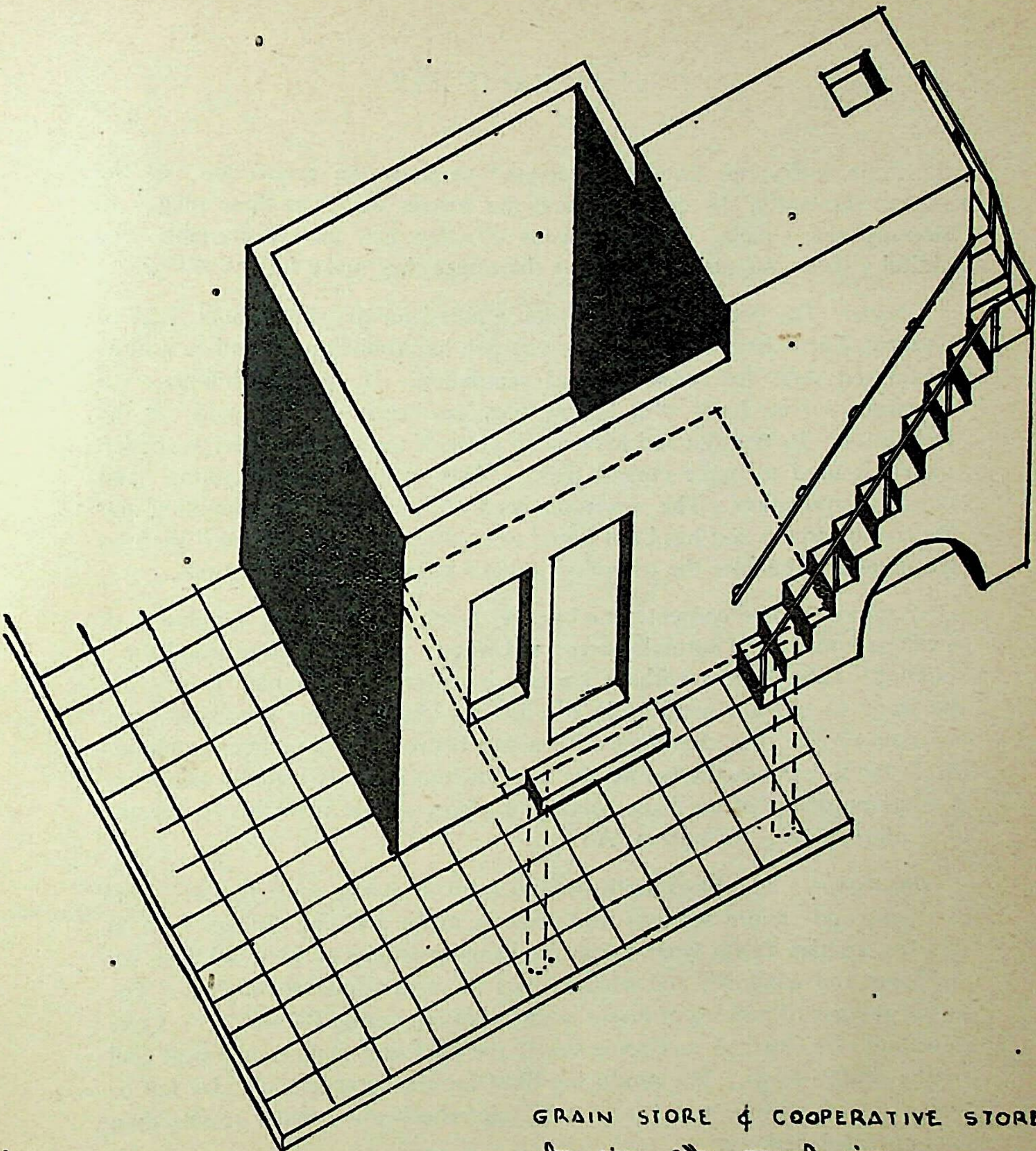
There is a close relationship between the moisture content of the grain and the dampness of the air at a particular place. High moisture content leads to sprouting and 'heating' of grains which again makes them useless.

It is clear from this that a grain store must be very well sealed.

Storing of grain direct from the threshing yard into a clean well sealed store is the first preventive measure. In Indian villages grain is mostly stored in bulk in a variety of bags and pots. The grain bin put up at the Exhibition has fulfilled the following requirements:—

1. Insect-proof: The walls, floor and ceiling have smooth plastered surface on the inside. The corners and edges are rounded off so that the bin can be cleaned thoroughly.
2. Rat-proof: The floor as well as the walls are of a solid material that rats cannot gnaw through.
3. Damp-proof: The construction of the bin is such that no moisture can seep through to the grain.

The seed is filled in from the top. After the grains are filled in, the mouth of the bin is made air-tight by means of mud plaster round the lid which is made of stone or wood. There is an opening at the bottom for drawing out the grains. The opening has been built on the wall of a hall adjoining the bin. This hall can serve a number of purposes including a co-operative shop.



GRAIN STORE & COOPERATIVE STORE

बीज भंडार और सहकारी भंडार

	Item	Quantity	Labour
1.	Bricks	16000	2. Masons for 30 days.
2.	Sand	150 c.ft.	1. Carpenter for 8 days.
3.	Cement	1·3 tons.	Unskilled Labour 2 Men for 30 days.
			" 1 Woman for 30 days.
4.	Country tiles . .	1800	
5.	Ballies of size . .	100 r.ft.	
6.	Timbers . . .	11 c.ft.	
7.	Bamboos . . .	2 score.	
8.	1½" Red Stone Slab .	60 s.ft.	

THE CRAFTSHEDS

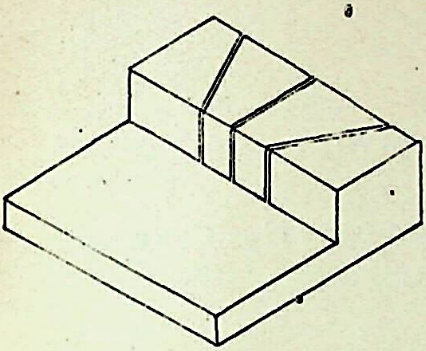
Four workshops have been erected to show the production of the potter, the smith, the carpenter and the weaver as far as these relate to housing in a village. The provision of a few new tools will enable the skilful village craftsmen to improve the things they make for the village.

Potter: The potter makes the tiles required for the village huts. Tiles of different shapes have come into use *viz.* flat, half-round and round as well as perforated slabs for screening and ventilation. A new technique to construct curved roofs with hollow tiles has been demonstrated at the Exhibition. In Wardha and Mysore, in place of the potter's wheel a wooden mould is used to make curved tiles. This ensures easy handling and uniform production. The new tools need no special skill for handling and the cost of production has been found to be 30 per cent. less than if the tiles are made on the tiles the orthodox potter's wheel. See illustrations.

Carpenter: The carpenter makes the doors, windows and ventilators of a village house. He normally uses local wood. While selecting wood for a building, timber pieces without knots are preferred. In order to dry out the wood to prevent warping in the finished products, big pieces of wood are stacked one over the other with a gap between to have free circulation of air for a few months before the construction work is actually taken up. A common defect of the loose joining of pieces can be remedied by the use of a mitre block. (Diagram 'A').

Blacksmith: The blacksmith obtains from a nearby town the steel bars of round and square sections and flats to make building fittings such as shabkas, kundas (chain type), hooks for hanging articles or fans, holdfasts for the doors and windows, and window bars to protect against burglary. The proper process of making of hooks is shown in diagrams "B" and "C". Coke of walnut size, washed and screened, is the best and most economical fuel for the smith's forge. For producing blast for the furnace a circular fan or blower (which can be made from a bicycle wheel) gives better results than hand-operated bellows.

Weaver: The weaver makes the matting and other thick cloths which furnish a village home. The 'duries' is used as covering for the floor and the 'khes' is spread on the bed. Curtains for the doors and the windows can also be made by the village weavers for making the homes gay.



MITRE BLOCK.
तख्ते के जोड़ काटने का साँचा
DIAGRAM A
चित्र 'अ'

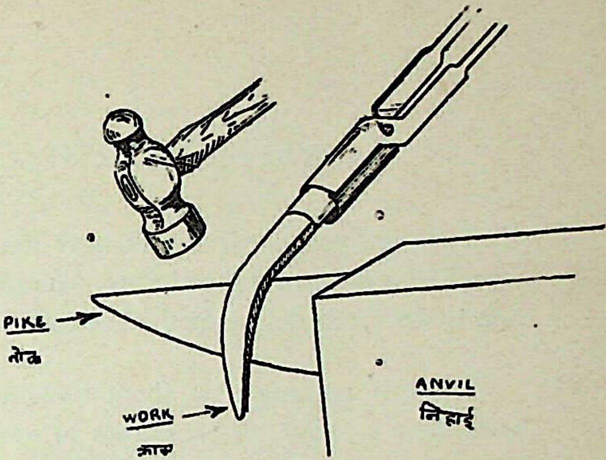


DIAGRAM B
चित्र 'ब'

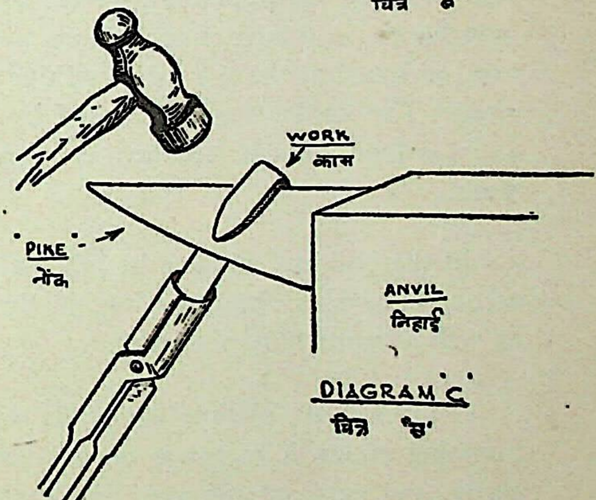
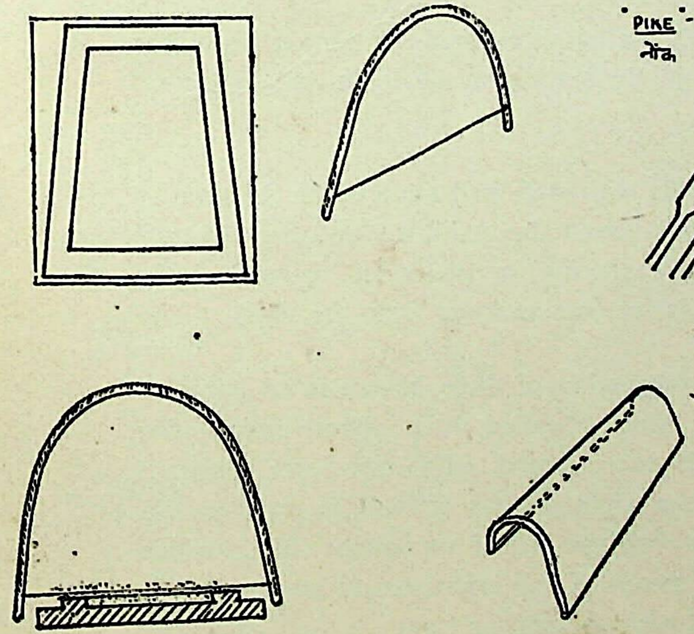


DIAGRAM C
चित्र 'स'



POTTERS MOULD & TOOLS FOR MYSORE TILES
खपरैल बनानि के लिये मैसूर के कुम्हारों के औज़ार

RAMMED EARTH CONSTRUCTION

Two rammed earth houses have been erected near the Village Centre. One is shown in its finished state, while the other is in the course of construction to demonstrate the methods employed.

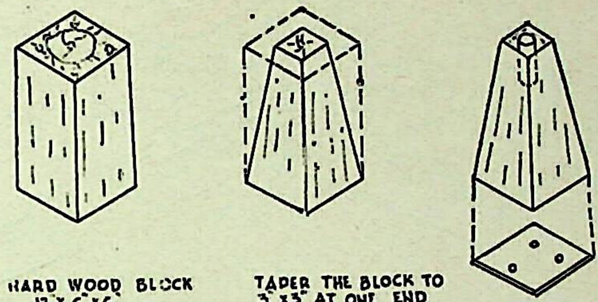
There is nothing new about building houses with earth walls. It has been done literally for thousands of years in many countries of the world. However, researches carried out in recent times have vastly improved the methods, and the application of the science of soils mechanics has made it possible to use a large range of soils without the risk of later trouble. Often the soil found at the site itself and dug from the foundation trenches can be used. The stabilisation of the soil by mixing in certain binding materials, such as lime, cement, bitumen, etc., gives moisture-resistant qualities to the walls.

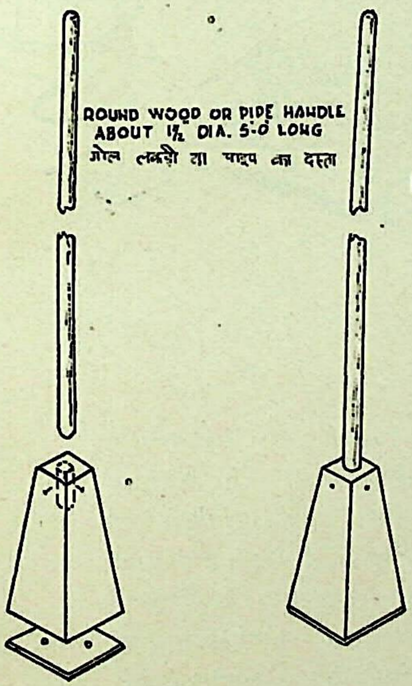
In the building of these houses use has been made of certain up-to-date techniques which make savings in the stabilising materials and in labour, as well as simplifying the work.

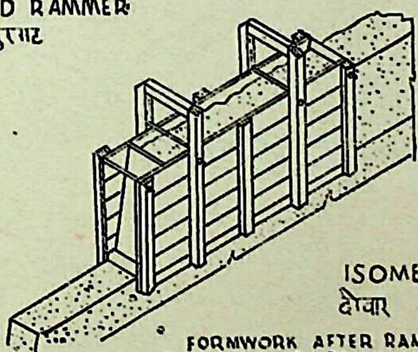
A method of "plating" the walls with stabilised material at the time of ramming makes a complete bond between the stabilised and the ordinary earths and cuts out the need for 'rendering' or plastering, as well as the 'keying' required to prevent the plaster coming away from the walls.

The form-work used in the construction of these houses is an improvement on the older types of forms which required to be almost entirely dismantled after each section of wall was rammed. The new form, which is being demonstrated in use on the straight lengths of wall, is progressively moved in the horizontal direction with the aid of supporting rollers which are built into the form-work. By means of this improvement approximately 1½ hours of labour-time is saved at each shift of the form.

The methods that have been demonstrated are simple. Under adequate supervision even unskilled labour can do the work. The roof and the floor of the house are covered by handmade tiles.







ISOMETRIC VIEW
दीवार बनाने का पूरा दृश्य

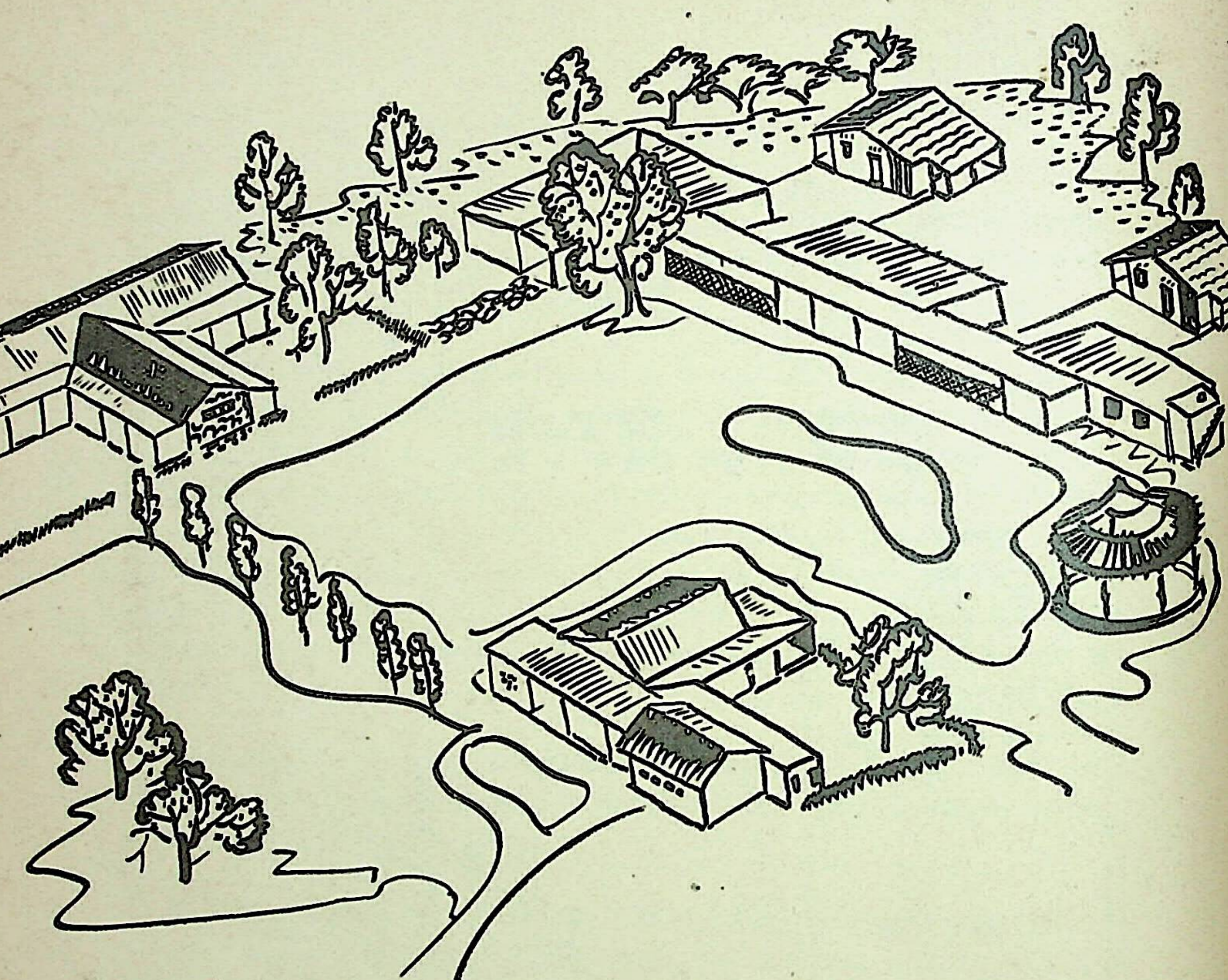
FORMWORK AFTER RAMMING A SECTION:
IT IS NOW READY TO LOOSEN THE NUTS AND
PUSH THE FORM ALONG

एक भाग को कूटने के बाद तैयार काम। अब सांचे के बोल्ट खोले जा सकते हैं और वह आगे बढ़ाया जा सकता है।

WOODEN RAMMER

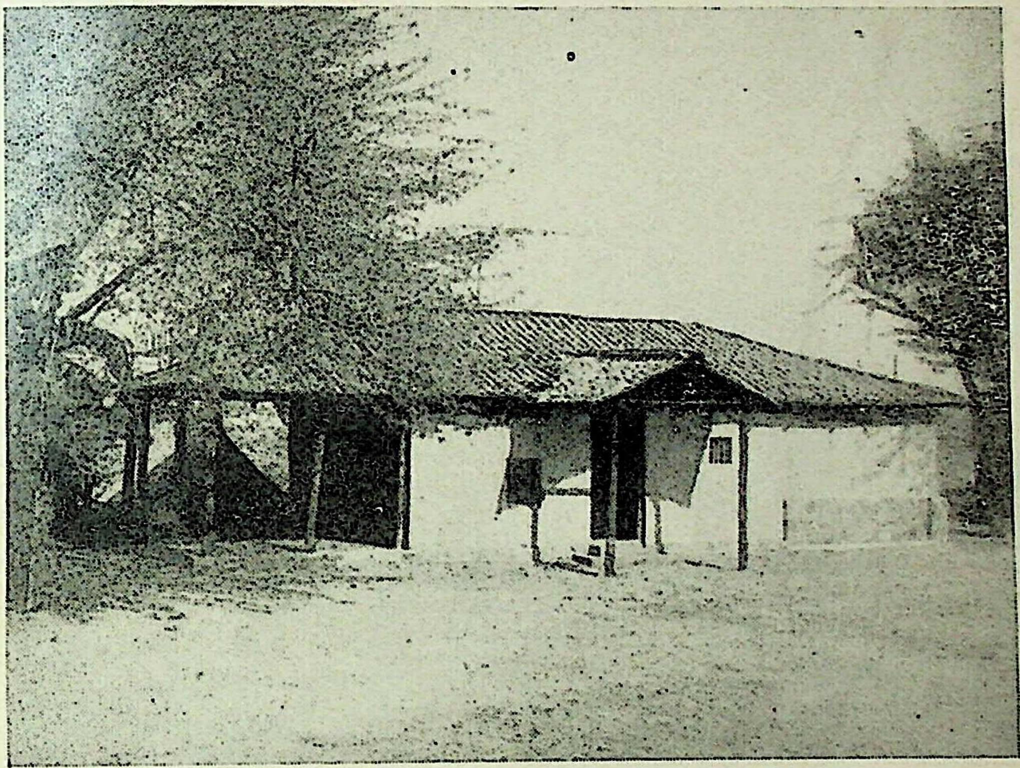
SCALE 1 FT. TO AN INCH.

लकड़ी का दुरमट



"I would say that if the village perishes, India will perish too. India will be no more India. Her own Mission in the world will get lost. The revival of the village is possible only when it is no more exploited. Industrialization on a mass scale will necessarily lead to passive or active exploitation of the villagers as the problems of competition and marketing come in. Therefore we have to concentrate on the village being self-contained, manufacturing mainly for use. Provided this character of the village industry is maintained, there would be no objection to villagers using even the modern machines and tools that they can make and can afford to use. Only they should not be used as a means of exploitation of others."

— GANDHI.



GANDHI NIDHI

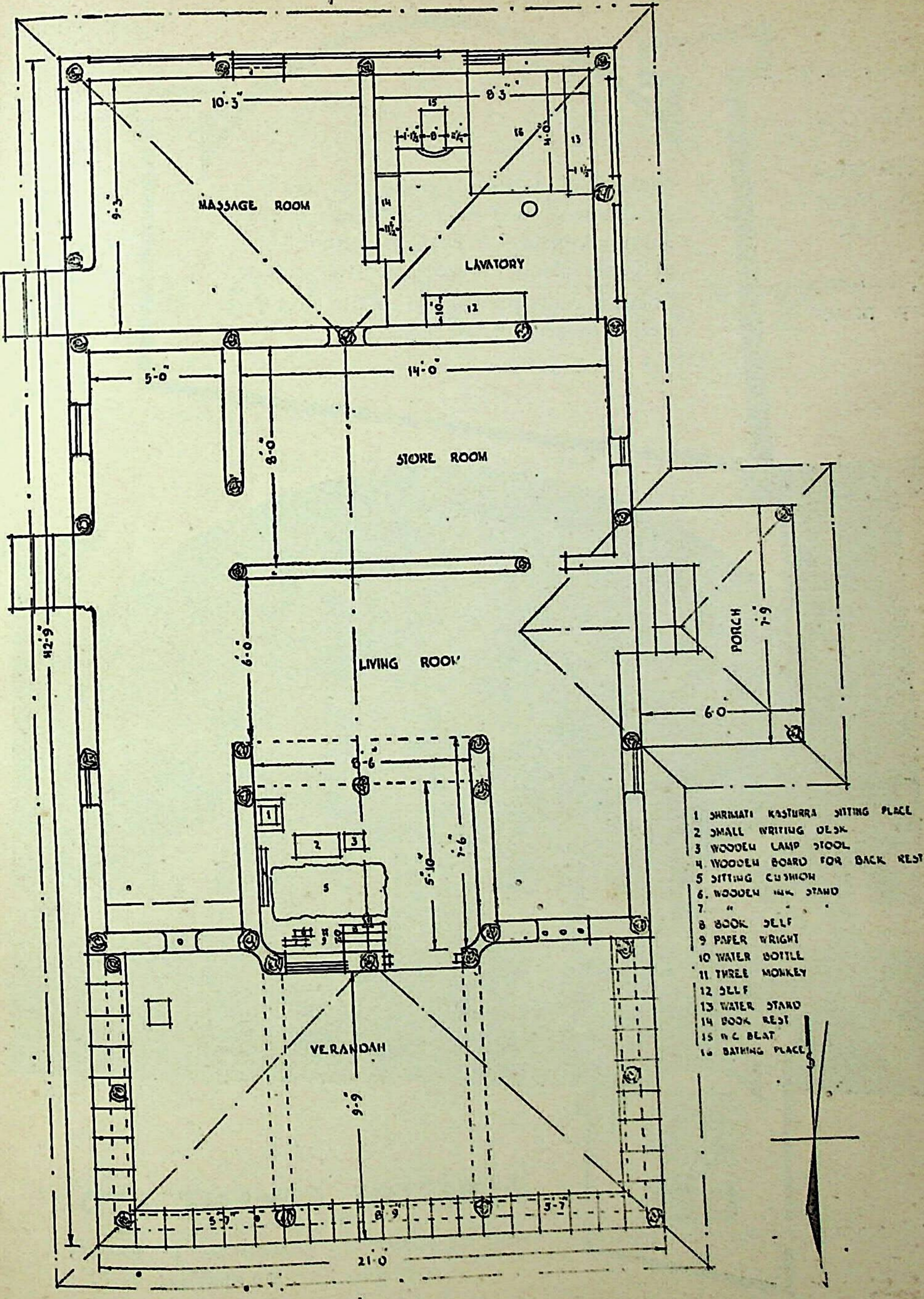
Gandhiji's Hut

GANDHIJI'S HUT

This is a full sized replica of the house in which Gandhiji lived at Sevagram. The simplicity of design and the utilisation of local materials is the key-note of this structure. The hut was built at Sevagram in two stages. The original portion of the hut consisted of a simple bed-room opening on to the verandah and another small room. Among the later additions was the massage room. The artists have, in this replica, reproduced the mud-plaster reliefs on the walls.

The hut has a rough timber frame-roof supported on ballis and covered with bamboo laths and cottage tiles.

You will see in the Rural Centre extending beyond Gandhiji's Hut many of the ideas about sanitation and other aspects of low-cost housing on which he devoted some considerable thought during his life time.



Scale 4 ft. to an inch

GROUND FLOOR PLAN

BAPU KUTI AT SEVAGRAM (WARDHA)

Grams'—' BIGSIX

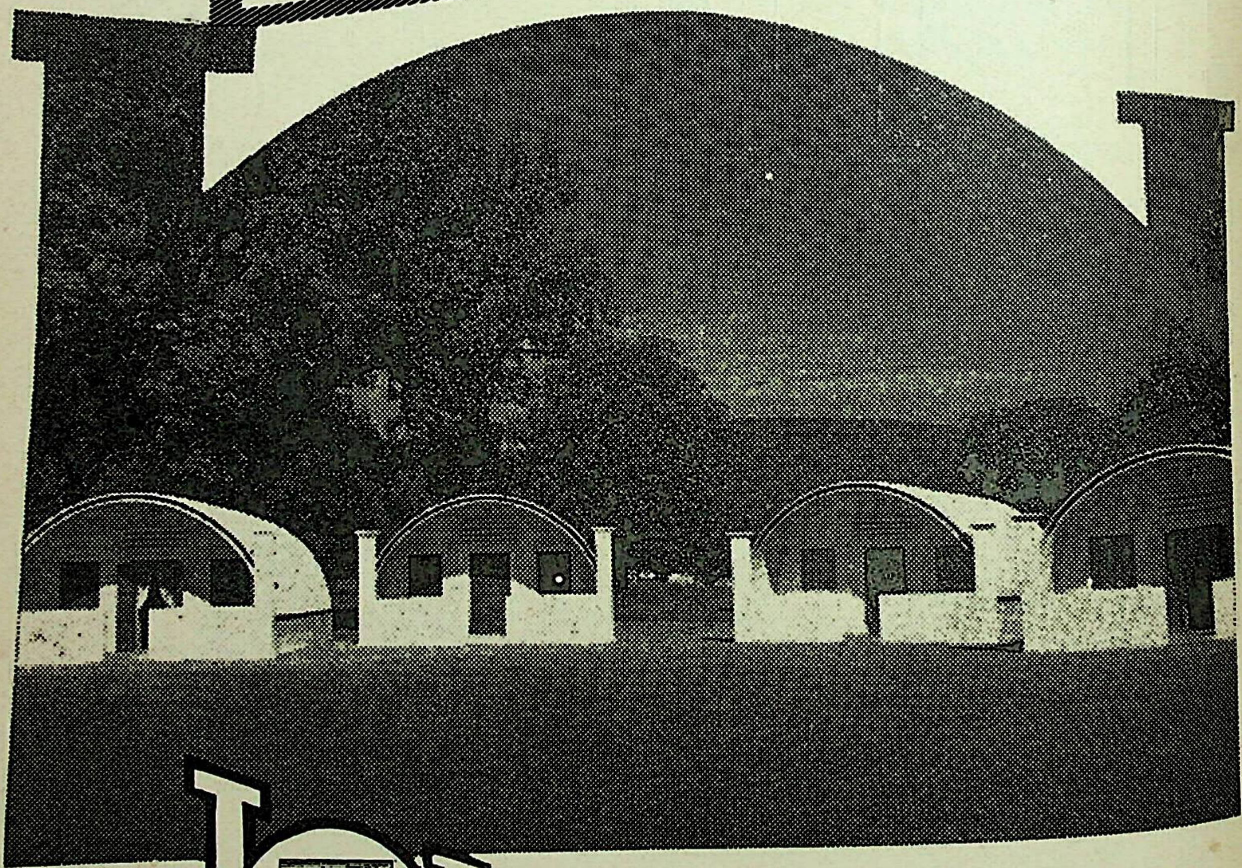
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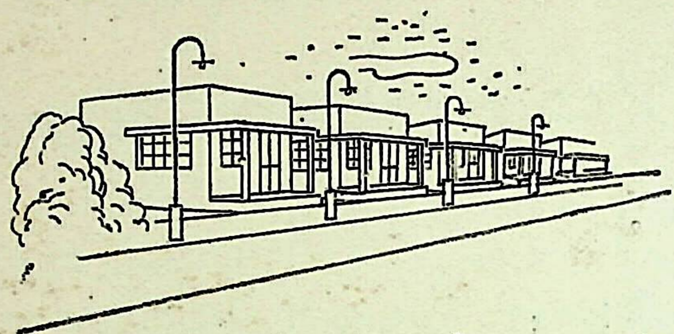


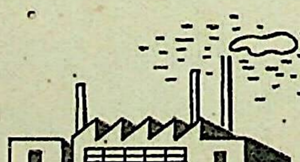
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Competition Prize Awards

COMPETITION ON LOW-COST HOUSE DESIGNS

Erected in the Model Houses Section of the Exhibition, you will find two houses built to the designs of two architects each of whom has been awarded the President's Gold Medal for the best design submitted in the Competition organised by the Ministry of Works, Housing and Supply on Low-Cost Housing.

The Competition was open to all architects, engineers and other designers working in India, who were asked to site their model house upon a plot 90 feet in length. Since it was realised that no one type design could be suitable for the whole of India, competitors were asked to design a model house for any of the three regions—hot and dry; hot and humid; and humid and wet—into which the country was divided for the purposes of the competition. The cost of Rs. 5,000, the ceiling limit, was to be equated, as far as possible, for the different parts of India.

Among other details about the site of the plot, a road was provided at the front of the plot, with a service road at the rear and a sewer and water-main running along the service road. The house was to be designed as a unit in terrace formation with natural light available only in the front and rear. It was to be provided with drainage, water and electrical services to the boundaries and the competitors were supposed to limit the cost of the house, the life of which would at least be 30 years, to Rs. 5000. This cost, it was further stipulated, would include the complete house ready for occupation, except for the usual tenant's fittings and fixtures such as lamp-shades and fans. Loose furniture, curtains etc. were not to be included in the cost, but could be shown in the drawings if desired. Within these limits, the competitors were free to suggest any building materials and any building technique they liked. The width of each plot and the amount of space to be left in the front and rear, and the orientation of the plot and the house were all left to the discretion of the competitors.

ASSESSORS' REPORT

The Ministry appointed Mr. Walter George, A.R.C.A., A.R.I.B.A. and Shri B. S. Puri, I.S.E., Retired Chief Engineer, Central P.W.D. as assessors and their Report on the Competition is as follows:

"One Hundred and Seventy designs were put before us, distributed into regions as follows:—

Region	Number	Total
Hot and Dry	79	85
Region unspecified, but generally suitable for Hot and Dry . . .	6	
Hot and Humid	63	85
Humid and Wet	22	
		170

2. "Some competitors submitted several designs; the total number of Competitors was 160.

3. "The designs submitted for the Hot and Dry Regions were not only more numerous, but also showed more concentrated thought and effort than the majority of those from the other two regions. When the drawings had been examined, it was clear that many of the designs which had been placed on the "short list" for the Hot and Dry Region were at least equal to if not better than the best in the other two regions.

4. "We, therefore, recommend that the distribution of the awards should be varied; we recommend that the Gold Medals be given for the Hot and Dry Region and the Hot and Humid Region and a Silver Medal only for the best design for the Humid and Wet Region. A Silver Medal should be given for each of the other two Regions, in addition to the Gold Medals for those Regions.

"This would bring the award into harmony with the number of designs submitted, and also with their merit; the attention given to the Humid and Wet Region was comparatively small, so that the best designs for this region were not worth more than an Honourable Mention. A Silver Medal is, however, recommended to the best entry for this region.

"We have carefully considered the designs submitted, and our award is summarised as below:—

HOT AND DRY REGION

Competitor No.	
143	Gold Medal. The house should be built.
11/2	Silver Medal. The house to be built, funds, space and time permitting.
11/1 & 11/3	Very Highly Commended.
21	Highly Commended.
159	Highly Commended.
4	Highly Commended.

HOT AND HUMID REGION

66	Gold Medal. The house should be built, funds, space and time permitting.
103	Silver medal.

HUMID AND WET REGION

Competitor No.	
49	Silver medal.
91	Commended.
75.	Mention.

THE KAGAL MEMORIAL AWARD

"An additional Gold Medal kindly presented by Mrs. Kagal is awarded to the Author of the best design and accompanying papers submitted in the competition considered as a whole, which we declare to be No. 143.

The Kagal Memorial Prize has been awarded by Mrs. Kagal in the memory of her late husband Shri B. R. Kagal, who was Land and Development Officer in New Delhi during the years 1930-1944. From 1944 to 1951 Shri Kagal was the Chief Town Administrator of the Tata Iron and Steel Company at Jamshedpur. Engineers and Architects in the profession in New Delhi and in fact throughout the country know the name of Shri Kagal very well. He designed the first low-cost housing colony in New Delhi at Babar Road, and started the branch of the Institution of Engineers in New Delhi, and was one of the first members from India of the British Town and Country Planning Association."

WALTER GEORGE,

NEW DELHI;

B. S. PURI,

The 11th December, 1953.

Assessors.

THE AWARDS

Hot and Dry

FIRST PRIZE—The Gold Medal—President's Award, First Prize, goes to Shri S. P. CAPRIHAN, Executive Engineer, P.W.D., Nagpur for his competition drawing No. 143. A house in plot No. 22 according to his design, has also been constructed in the Model Houses Section.

SECOND PRIZE—Shri J. L. Malhotra, Assistant Architect, Chandigarh is the winner of Silver Medal—President's Award, Second Prize, for his competition drawing No. 11/2.

Hot and Humid

FIRST PRIZE—Shri V. J. Mistry, Assistant Architect, C.P.W.D., New Delhi, has been awarded Gold Medal—President's Award, First Prize, for his competition drawing No. 66. A house in plot No. 4 according to his design has also been constructed in the Model Houses Section.

SECOND PRIZE—Shri F. B. Pithavadian, Architect and Civil Engineer, Kilpank, Madras, has been awarded Silver Medal—President's Award, Second Prize, for his Competition drawing No. 103.

Humid and Wet Region

The first prize award for this region, as stated in the Assessors Report has not been given to anybody, because no plan, out of the submitted ones, was adjudged as deserving for it.

SECOND PRIZE—Shri K. V. Thadany, Regional Engineer, The Concrete Association of India, 9, Mount Road, Madras.

Kagal Memorial Award

SHRI S. P. CAPRIHAN, who has been awarded First Prize for Hot and Dry Region, has also won Kagal Memorial Award—a Gold Medal.

HONOURABLE MENTIONS

The names of the competitors, who receive honourable mention from the assessors are as follows:—

Competitor No.	*Name*	*Remarks*
	HOT AND DRY REGION	
11/1 and 11/3	Shri J. L. Malhotra	Very Highly commended.
21	Shri G. C. Sharma, New Delhi.	Highly commended.

Competitor No.	Name	Remarks
159	Shri Balkrishna V. Doshi, Rue De Sevres, Paris.	Highly commended.
4	Shri V. K. Sahasrabudhe, Asst. Architect, C.P.W.D., New Delhi.	Highly commended.
	HUMID AND WET REGION	
91	Shri L. M. Chitale, Chartered Architect, Madras.	Commended.
75	Shri L. Gopala Rao, Consulting and Chem. Engineer, Calcutta.	Mention.

THE DESIGNS

The designs submitted by the Gold Medalists are reproduced in this brochure.

The comments of the Assessors on the design submitted by Shri S. P. Caprihan, the winner of the President's Award, First Prize and the Kagal Memorial Award are as follows:

"This is the most completely worked out set of drawings, reports, calculations and estimates submitted.

It wins on its plan, not on its special methods of construction.

The same house could be built on this plan, using ordinary methods and materials, by private owners, at much about the same cost, in many areas. The special methods, (which are completely and fully shown) of using pre-cast reinforced of concrete, can only reduce the cost a little, but could materially shorten erection-time, and ensure better quality of concrete, through controlled mass-production by Governmental or other large public bodies have their own executive agency. The special methods of construction are not an essential part of the design, which is capable of application over wide areas, in varying materials, to suit varying circumstances.

A single house could not well be built within the price, from these drawings, without some modification of detail, and may be also of construction, but if a sufficiently large scheme were put in hand to pay for all the special moulds required, the target might be attained. As it stands, it is a design for mass production.

The Plot width is 33′-9″. It might be made 34 or 35 feet with advantage, at a slightly greater cost."

The comments of the Assessors on the design submitted by Shri V. J. Mistry, the winner of the President's Award, First Prize for the Hot and Humid Region, are as follows:

> "This provides Living Room and 2 Bed Rooms, which will have fair, but not perfect, through ventilation.
>
> This is one of the few in this group to which the same care and thought has been given as in many for the Hot and Dry Region.
>
> The type of construction is normal. The covered area is smaller than similar plans for the Dry and Hot Region because of higher local costs. Costs could however be reduced by cutting out certain items of construction which are not indispensable.
>
> The Plot width is 29′-0″."

COMPETITION ON TOWN PLANNING IN INDUSTRIAL AREAS

In the Educative Model Section of the Exhibition you will find displayed a model of a town plan which has won the President's Gold Medal for the best plan submitted in the Competition organised by the Ministry of Works, Housing and Supply on Town Planning in Industrial Areas. The object of the competition was to obtain a number of well designed and worked out Industrial Housing Schemes as illustrative of what properly planned industrial housing developments should be like. The competition was open to all qualified Town Planners, Architects and Engineers who were set the task of providing 1000 industrial workers with housing accommodation in an area of about 75 acres, close to the industry, allotted by an imaginary local authority. The income of the industrial workers, the competitors were told, could be taken as ranging from Rs. 60 to Rs. 400 and over per month, with 80 per cent. of them in the range of Rs. 60 to Rs. 120 p.m. The ability of the workers to pay rent varied from 10 per cent. by the lower income groups to 15 per cent. in the higher, but the family income could be assumed to be augmented by secondary occupation of the members of the workers' families. Given these conditions, the competitors were asked to choose an actual area of approximately 75 acres in an industrial town with which they were familiar and to prepare a lay-out plan of the area, indicating the residential units recommended by them in types, and amenities like schools, welfare centres, health clinics, shops, playgrounds, parks, etc., which they would like to provide in the area. The competitors were also required to indicate in the plan, roads, footpaths and service roads as well as water, sewage, electricity and gas installations and suggest a desirable landscape treatment. A general plan indicating the relation of the proposed development to the rest of the town or city was required. A final requirement of the competition was that the competitors should produce a report explaining broadly the standards of development adopted for their schemes and the general characteristics and economics of their plan.

Assessors' Report

The assessors for the competition appointed by the Ministry were:—

(i) Shri M. Fayazuddin, F.R.I.B.A., F.I.I.A., President, Institute of Town Planners, India;

(ii) Professor M. J. Tyrwhitt, A.I.L.A., A.M.T.P.I., S.P. (Dip), U.N. Director for Seminar on Housing; and

(iii) Nawab Zain Yar Jung, M.I.E., F.I.I.A.

According to the assessors, Competitor No. 2 submitted the best Scheme. The Scheme, in their opinion, was well thought out and well presented in drawings and reports. All the points required by the assessors had been covered in the Scheme, but taking into consideration the prevailing winds and the temperatures of Gwalior, where the Scheme is supposed to be located, the assessors thought it would have been better if the general orientation had not been east-west. The hostel arrangements for single workers and the general density and distribution of population suggested by the Competitor were thought to be practical.

The assessors considered Competitor No. 5 worthy of a Silver Medal. His lay-out was considered attractive and the large central open space shown by him met with their approval. The assessors, however, remarked that this competitor had not paid sufficient attention to orientation, that there was an excessive use of cul-de-sacs and that his report did not contain sufficient detail, especially on the financial implementation of his Scheme.

The Awards

The Ministry have accepted the assessors' report and have announced the names of the first two competitors.

Competitor No. 2, who gets the Gold Medal—President's Award: First Prize—is Shri OM SWARUP, a student of the Royal Institute of British Architects, 82 Bartholomew Road, London.

Competitor No. 5, who gets the Silver Medal—President's Award: Second Prize—is Shri Saroj Kumar Ghosh, B.E., A.M.I.E., of 7, Old Post Office Street, Calcutta.

Shri Om Swarup sites his industrial township near Gwalior, in the valley of the Sonrekha and envisages the workers as essentially working in the carpet industry.

COMPETITION ON LOW COST FURNITURE

One of the Model Houses at the Exhibition, you will notice, is equipped with furniture and furnishings of a peculiarly attractive and useful design. The designer of this furniture and furnishing is Shrimati Urmilla E. Chowdhury, B.Arch., of Simla, who has been awarded a Silver Medal—President's Award, Second Prize, in the competition held by the Ministry of Works, Housing and Supply for the selection of the best low-cost furniture designs.

The competition was open to all architects, engineers, furniture manufacturers, furnishers and other designers who were given the design and specifications of the house to be furnished and were asked to design the furniture for a family of five. The competitors were free to adopt any material, such as soft wood, hard wood, teak wood, bamboo etc. to produce furniture that would last for at least fifteen years without involving any heavy maintenance. The limit of the cost of furniture, including simple furnishings such as curtains, rings, durries, mats etc. was fixed at Rs. 500. The cost was to be equated, as far as possible, for the different parts of India, according to the information available with the Ministry, supplemented by any enquiries the assessors might wish to make.

The assessors appointed by the Ministry were:—

(i) Kumari Sheric Doongaji, Lady Irwin College, New Delhi;

(ii) Shri G. B. Deolalikar, F.R.I.B.A.;

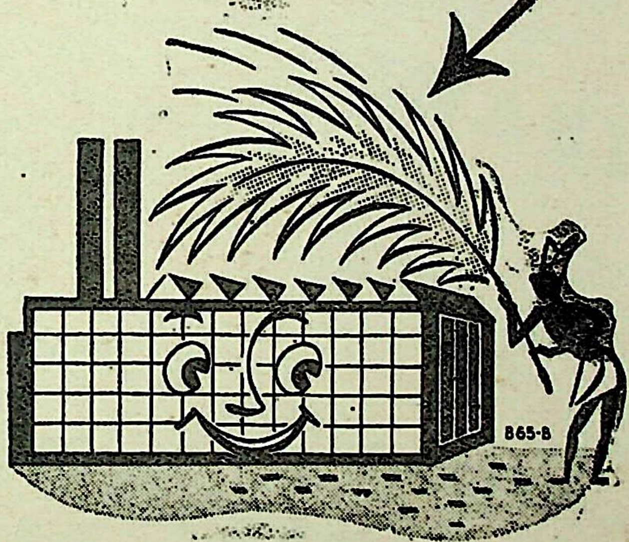
(iii) Sardar Mohan Singh, Oriental Building and Furnishing Co., New Delhi.

The assessors did not recommend the award of a Gold Medal to any of the competitors, but adjudged the design submitted by Shrimati Urmilla Chowdhury as deserving of a Silver Medal. They also recommended that the designs prepared by Mr. S. K. Dutta, Assistant Architect, Chandigarh, may be displayed at the International Exhibition on Low Cost Housing. These drawings can now be seen in the Educative Model Section of the Exhibition.

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7 REFRIGERATOR
8 VACUUM CLEANER
6 RADIOGRAM
11 ELECTRIC LAMPS AND FITTINGS
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Educative Model Section

EDUCATIVE MODEL SECTION

This Section of the Exhibition, housed in the big hall facing the Pylon, contains exhibits, models and charts on architecture, housing, town and country planning. If you enter this building from the hall where the Seminar is being held, you will find the exhibits in roughly the same order, as indicated below.

GOVERNMENT OF INDIA SCHEMES.

i. Housing the Displaced—Layouts and models of displaced persons housing in and around Delhi, a model of New Delhi showing Government and displaced housing.

ii. Industrial Housing—Plans and photographs of housing for workers of Telephone Cable Factory at Rupnarainpur, West Bengal.

iii. Government housing of various grades of officers and staff in Delhi.

iv. Development Plan of Andaman and Nicobar Islands along with type design of low-income group houses.

v. Housing the Members of Parliament—plans and photographs of the newly built flats in Delhi.

vi. The Ministry of Works, Housing and Supply exhibit a panel showing the subsidised industrial housing scheme and the houses built for industrial workers all over India.

HOUSING AND PLANNING SCHEMES OF FOREIGN COUNTRIES

i. Austria.

The exhibits from Austria present low-cost housing in Vienna in 56 panels, two layout models and two building models. The panels show the historic development of Vienna dating from 1850 and analyse in detail, the problems of need of housing and redevelopment of Vienna. In addition, there is a proposal for a low-cost house for India in a set of two panels. These exhibits have been prepared by the Municipality of Vienna and exhibited by the Austria Legation in Delhi.

ii. Britain.

The panel consists of photographs of latest types of low-cost housing and flats in Britain. These are exhibited by the British Information Service, U. K. High Commission in India.

iii. **Puerto Rico.**

The Exhibit consists of 16 panels showing the development of Puerto Rico and lays emphasis on aided self-help housing. There is a big panoramic view of Puerto Rico and an automatic slide projector which projects pictures of interest. This exhibition was brought to India by the combined efforts of United States Technical Cooperation Mission in India and the Puerto Rico Planning Board.

iv. **Germany.**

Nine panels show housing schemes for workers in various parts of the Federal Republic of Germany.

v. **Finland.**

Exhibits consist of plans and photographs of prefabricated timber houses. These have been exhibited by the Finish Legation in Delhi.

vi. **Italy.**

The eight panels consist of photographs and plans of schemes prepared by INA-CASA, a State sponsored housing organisation in Italy.

vii. **Indonesia.**

The Republic of Indonesia have sent a large size exhibition which consists of the master plan of Djakarta City, models of low-cost housing and materials used for low-cost housing. This exhibition has been prepared by the Public Works Department of the Indonesian Republic.

viii. **Burma.**

The Ministry of Housing and Labour, Government of Burma, exhibits photographs, plans and models of their low-cost housing prepared by the National Housing and Town and Country Development Board.

ix. **Singapore Improvement Trust.**

Photographs, plans of housing and layouts are exhibited by the Singapore Improvement Trust.

x. **Thailand.**

Photographs showing wooden houses have been contributed by Thailand.

xi. **Ceylon.**

Ceylon has two Sections—one on rural housing and the other on urban housing. Models of layouts and plans of houses have been prepared by the Department of Town and Country Planning, Colombo.

xii. **Japan.**

Exhibits cover various aspects of life in Japan and show plans and photographs of housing schemes throughout Japan. These have been put up by the Japanese Embassy in Delhi.

xiii. **South Pacific Islands.**

Photographs of types of houses in the various islands in the region. Exhibited by permission of the South Pacific Commission.

xiv. **C. I. A. M.** (International Congresses of Modren Architecture)

Photographs of selected items from C. I. A. M. Exhibition on low-cost housing in North Africa.

xv. **Australia.**

There is a panel on Fibrous Plaster which is widely used in Australia and Newzealand. This exhibit is from the Division of Building Research, Commonwealth Scientific and Industrial Research Organisation, Australia.

xvi. **Fiji.**

The Public Works Department of Fiji has exhibited plans and progress photographs of cottage type of housing in Fiji.

xvii. **Low-Cost Housing in United States of America.**

The Exhibit consists of photographs of public housing in various parts of United States of America and has been put up by the United States Embassy in Delhi.

xviii. **Dar-es-Salam.**

Plans and photographs for experimental African housing.

xix. **British Guiana.**

Standard low-cost housing and unit prefabrication projects of the Ministry of Health and Housing of British Guiana.

xx. **Kenya.**

The Government of Kenya has sent charts, photographs and plans of low-cost housing in Narobi and Mombassa.

xxi. **Israel.**

The exhibit consists of seven panels showing housing activities in Israel.

xxii. **Building Research Station at Watford, England.**

Four panels analysing the necessities of comforts and materials in low-cost housing for the tropics.

xxiii. **Community Core.**

Presents the functions of a Community Core as a fundamental tool for community development and betterment. This exhibit has been sent by the United Nations Housing Section.

xxiv. **UNESCO Village.**

Photographs of houses constructed in a UNESCO Village exhibition in Japan.

HOUSING AND PLANNING IN INDIAN STATES

i. **Punjab.**

The Exhibit consists of a master plan of Chandigarh, models of houses for various income-groups, charts and plans and photographs of layouts and buildings already constructed.

ii. **Madras.**

Models of rural thatched hut, urban terraced housing and pre-cast cement concrete hut along with specifications and information.

iii. **West Bengal.**

Industrial housing schemes and some housing of community development projects.

iv. Madhya Pradesh, Madhya Bharat, Himachal Pradesh, Saurashtra, PEPSU and Vindhya Pradesh have exhibited plans and models of low-cost houses.

v. **Bombay.**

The Bombay Housing Board has exhibited a large number of models of layouts and houses constructed by the Board.

OTHER ORGANISATIONS AND INSTITUTIONS

i. **Central Water and Power Commission.**

Plans of housing in some of the River Valley Projects.

ii. **Indian Railways.**

Models constructed by the Central and Western Railway of pre-fabricated houses and multi-storeyed flats for officers and workers of railway staff.

iii. **Delhi Polytechnic School of Architecture.**

Students work of the Delhi School of Architecture.

iv. **Central Building Research Institute, Roorkee.**

The C.B.R.I. exhibits sets of photographs dealing with the design of buildings, precast concrete and pre-stressed concrete, and the production of some building materials. Models of corrugated concrete shell structures completed abroad are exhibited. Amongst them are, a multi-span factory as erected in Northern Rhodesia; an open-sided building used as garage in Eire; a domed end as built for the Ministry of Works in London and a twin-structure which is now being erected in the grounds of the C.B.R.I., Roorkee.

An artificial sky model illustrates the design of buildings in the Tropics as far as the solar path is taken into account. In connection with this, a number of solar charts are displayed which are drawn up for the principal regions and cities in India, *e.g.*, Delhi, Calcutta, Bombay and Madras.

v. **Institute of Technology, Kharagpur.**

Plans of low-cost housing and staff housing.

vi. **Ministry of Labour, Government of India.**

Housing in Coal Mines.

vii. **Indian Standards Institution.**

Charts to justify the necessity of standardisation of building materials and other materials associated with building industry as well as equipments used in a house. There is a model showing the economy and advantages using modular co-ordination.

viii. **Technical Book Stall.**

A collection of technical books on Housing, Building and Town Planning.

FIVE YEAR PLAN EXHIBITION

The one thing that is bound to attract your attention as you enter the Five Year Plan pavilion will be a large replica of the well known book on the Five Year Plan. The book is suspended from the ceiling and from it flow out as it were extracts on the significant aspects of the Plan. You may have a vague impression of what the book on the Plan contains but here you will get an opportunity to read the basic concepts of the Plan. There will also be other exhibits which will help you to know the Plan. For instance there will be a machine which like a robot will flash across a glass plate answers to questions on the Plan. Then there is a projectograph, showing scenes of developmental activity on a small screen. To help you to know the Plan, three dimensional charts on the targets have been put up; the usual charts were always a bit discouraging for the layman, but you will find the new type both attractive and useful. Of course, there are a variety of models, showing irrigation projects, agricultural schemes and social welfare development plans etc. A working model of the Bhakra Dam, surrounded by panels of photographs on the work already completed will be a great centre of attraction. Perhaps you will be surprised to see in a panel what a dwarf the Qutab Minar looks in relation to the height of the Bhakra Dam and to know that its tunnels are the largest in the world. The Sindri model in the Industrial Sector of the Exhibition will be of no less interest, with its large proportions and imposing lay-out. Apart from these provision has also been made for a day-light cinema, which will be continuously showing documentary shorts on the various developmental projects.

Building Materials and Construction Technique Section

BUILDING MATERIALS AND CONSTRUCTION TECHNIQUE SECTION

The purpose of this Section is to show the correct usages of different types of new as well as traditional building materials in building construction. The following institutions and firms have taken part in this Section:—

i. Central Building Research Institute, Roorkee.
ii. Forest Research Institute, Dehra Dun.
iii. Central Public Works Department.
iv. Government of the Punjab.
v. Government of Uttar Pradesh.
vi. Government of Rajasthan.
vii. Government of Madhya Pradesh.
viii. Hindustan Housing Factory.
ix. Bikaner Gypsums Ltd.
x. Standard Brick & Tile Company.
xi. John P. Anderson.
xii. Universal Screw Co., Delhi.
xiii. Asbestos Cement Company.

Central Building Research Institute, Roorkee.

A corrugated concrete shell roof of 40 ft. span covers all C.B.R.I. exhibits in the Construction Technique Section. This shell is only 2½″ thick and the amount of reinforcement in it is half a pound of steel per sq. ft. of shell roof. Another exhibit is a corrugated concrete shell roof of 20′ span showing the different stages of construction.

The third exhibit shows a new process of construction *i.e.*, a flat corrugated concrete roof. With this type of roof free spans of up to 50 ft. and even more can be covered. Its greatest advantage lies in the fact that no timber or steel is required for the formwork. The structure is built on a flexible mould consisting of jute fabric or similar type.

The last exhibit is a specimen of light-duty concrete floor. It provides for a layer of air between the ground and the floor and, therefore, is cool in summer and warm in winter. Its cost is quoted to be Rs. 37 per 100 sq. ft.

In the Building Materials Section, the C.B.R.I. show a collection of samples of brick earth and burnt bricks from different parts of the country. Charts display the properties of these exhibits. Other samples shown are sand, aggregates, building lime, tiles and building stones. Illustrations are given of the improvement achieved in the quality of bricks made of low-

grade materials. Samples of bricks from black cotton soil areas are shown along with charts explaining manufacture and properties. The utilization of ash from Sindri factories is again illustrated in charts and samples. A number of samples of Indian and foreign vermiculite are displayed in their original state and after exfoliation.

A small plant for the production of twin-twisted steel is shown in working condition. The process consists in twisting two mild steel bars of equal length and diameter into one twisted unit, whereby the strength quality of the steel is considerably improved. The yield of twin-twisted steel is approximately 50 per cent. higher than that of plain mild steel bars. When such twisted bars are used as concrete reinforcements, considerably higher working stresses are permitted in the structure and a saving of *one-third* of the steel tonnage is obtained.

A recent development made by the C.B.R.I. is the production of elastic concrete which is *not* prestressed. A sample board made of this novel material is displayed. The board is 10 in. wide, only 1 in. thick and 10 ft. long. Its deformation, when supported over 8 ft. span, is fully elastic.

The last exhibit in this section is a prototype of a tied arch consisting of hollow tiles embedded in mortar. This type of construction is more adaptable than the full arch in that it can be used as a roof on vertical walls of conventional type, such as brick, block, and stone walls. Preliminary estimates indicate that it is highly competitive if compared with conventional construction. Such arches have already been built up to 20 ft. span and tested to destruction with satisfactory results.

Forest Research Institute, Dehra Dun.

The Forest Research Institute have exhibited the following items:—

(a) A Model showing the importance of preventing erosion of soil over catchment areas by preserving forests and encouraging cultivation of land.

(b) Photographic slides showing construction techniques in timber engineering. These slides illustrate the use of timber connection, disc dowels, form work for bridges, aeroplane hangars, silos for cement storage, trusses for large spans, laminated arches and girders, towers, pylons, frame work for floors and walls of buildings.

(c) In this sub-section, action of termite and other insects on timber and its preservation by the use of termite sheets and chemicals, such as Ascu, has been illustrated by models.

(d) Comparative suitability of the properties of important varieties of Indian timber is explained.

(e) Different methods of stacking timber logs for seasoning; the moisture contents of green timber and seasoned timber; defects resulting due to improper seasoning such as star shakes, warping, honey combing, cup, end

splits, collapse, surface cracks, twists,—all these are shown by the Forest Research Institute. Defects due to use of unseasoned timber in furniture and doors and windows are also explained.

(f) Small scale models showing the economy that can be effected in the design of large-span trusses by use of small sizes and lengths of timber are illustrated. These designs avoid the use of complicated joinery and metal fastenings and thus effect saving in transport charges and labour.

Central Public Works Department.

The Central Public Works Department have exhibited the following items:—

(a) A full-size model of a building, illustrating how a house should NOT be constructed. The defects in this building are indicated by the twinkling red bulbs. The study of this building reveals:—

(i) the causes for the failure of foundations;

(ii) the defects in foundation and plinth masonry;

(iii) the defects in superstructure masonry walls;

(iv) the defects in wood-work of doors and windows and wrong usages of timber;

(v) the defects in reinforced concrete work;

(vi) the defects in wood joinery of roof scantlings;

(vii) the defects in plaster due to presence of *kankur* in sand, presence of salt and presence of impurities such as timber, coal, etc.;

(viii) the defects in flooring, such as settlement cracks due to improper filling, pannels laid in different levels, slopes of floors in wrong direction; and

(ix) the defects in planning, such as faulty position of doors and windows to make the room area ineffective for proper use; door and window opening in the wrong direction; blocking the ventilation of the kitchen by an improvised room, providing a cattle-shed by the side of the bed-room with an inter-connecting door; and allowing the kitchen and bath to open directly into the living room.

(b) Different types of bonds used in brick masonry in India and foreign countries, clearly indicating their characteristics, are shown by the C.P.W.D. Full size model walls, with different bonds showing their sections, have been constructed to illustrate the characteristics of the bonds.

(c) Full-size models of different types of arches used in building construction.

(d) Different types of roofing materials for sloping roofs such as Mangalore tiles, Allahabad tiles, country tiles, asbestos corrugated and Trafford sheets and asbestos pipes and fittings for roof drainage.

(e) The manufacture of bricks by hand and by machine is shown; so also the desirable standards for different types of bricks and brick work, samples of different type of clay bricks and tiles and samples of bricks with various defects which should be avoided in selecting bricks.

(f) Hollow concrete blocks, hollow mortar blocks, Gypsum hollow blocks, light weight hollow concrete blocks which form an important alternative walling material are exhibited by the C.P.W.D.

(g) The manufacture of lime is illustrated by a model lime-kiln and samples of lime stone from quarries, unburnt lime and slaked lime.

(h) Desirable standards for sands used in building work and tests required for checking the impurities in sand are clearly brought out. Also shown is a model of sand-washing apparatus.

(i) Requirements and characteristics of mortars in building construction and recommended uses of different proportions of mortars for different types of buildings, are shown by the C.P.W.D.

(j) Desirable standards for timber for building work, showing samples of good quality of different type of timber and timber with defects, are exhibited by the C.P.W.D.

(k) Desirable standards for stone aggregates for reinforced cement concrete work, samples of different sizes of aggregates commercially available, samples of defective aggregates and sands, effect of grading of aggregates on the strength of concrete, relation of water, cement ratio on strength of concrete, use of slump test and crushing strength test of concrete for checking the quality of the concrete—all these are shown by the C.P.W.D.

(l) Constituents of oil paints, varnish, etc., and samples of ready made paints, varnishes, bees-wax polish, distemper, snowcems and cement colours used in buildings are demonstrated by the C.P.W.D.

(m) The Central P.W.D. shows samples of different types of glasses used in building work and their characteristics and usages.

(n) Samples of different types of flooring materials such as Indian marbles, Indian paving stones, hydraulic pressed precast terrazo tiles, acid-proof tiles, ordinary cement concrete precast tiles and models showing construction of different types of flooring, such as ordinary cement concrete flooring, terrazo flooring *in situ*, wooden block (Parquet) flooring, terrazo precast tile flooring and brick pavings are shown by the C.P.W.D.

(o) Full-size models of different types of figured brick-work in ornamental brick facings of buildings.

(p) A sectional model showing the construction of different types of doors and windows and also samples of door and window fittings used in building work, samples of venitians.

(q) Small-scale models showing form work for typical reinforcement cement concrete members in building frames such as columns, walls, beams, slabs and footings.

(r) Models of timber trusses, timber frames, and timber staircases.

(s) Different types of sanitary and water-supply fittings such as Indian type W.Cs., European type W.Cs., Anglo-Indian type W.Cs., Orissa pattern W.Cs., different type of wash-hand basins, urinals, various types of water supply, chromium plated and brass fittings, G.I. pipes and specials, C.I. pipes and specials, S.W. pipes and specials.

(t) On the electrical side, the C.P.W.D. have a board display showing the different systems of wiring, i.e. V.I.R. cables on cleats, on surface conduit, in casing and capping and in recessed conduit. L.S. and T.R.S. cable on T.W. battens; light fittings, buzzer, bell and bell indicators; and sections of surface conduit wiring and L.S. wiring on T.W. batten are also shown on this board display.

On display at the boards are also different types of cables and wiring accessories suitable for house wiring. Different kinds of accessories for main and distribution boards; of conduits (heavy guage) and of bells and bell indicators, manufactured in India, are shown by the C.P.W.D.

A number of tables display fixing materials for wiring and accessories: different light fittings for wiring and testing instruments for house wiring.

A set of five pictorial sketches show the first-aid treatment to be given in case of electric shocks; a chart plan shows the standards of illumination recommended for different purposes and the method of indirect lighting with flourescent tubes housed in plaster of paris mouldings. A pedestal stall with the caption "Let Electricity Serve You" shows the different types of domestic electrical appliances.

(u) Illustrated by models and charts are the precautions to be taken to avoid accidents during construction and the implements to be used for the prevention of injury to the workers.

(v) The various labour welfare measures undertaken by the Department to ensure regular payment to the workers and to ensure their health are illustrated by models and charts.

Building Research Institute, Punjab Government.

The Institute has established a mobile laboratory to show the actual field tests which are carried out at site for the construction of soil-stabilized houses and roads.

Demonstrations show the effect of rain on different types of plaster, on sun dried brick walls and on ordinary mud plaster. A 5 per cent. bitumen emulsion stabilized mud plaster, cement plaster and lime plaster show the

suitability of bitumen stabilized plaster for sun dried brick walls when compared to the other types of plaster.

Demonstrations show the actual construction of ordinary compacted mud walls with bitumen stabilized plaster and cement stabilized earth wall.

Government of Uttar Pradesh.

The Government of U.P. show a hollow cement concrete block making machine locally manufactured with representative samples of different types of clay bricks and hollow bricks, samples of non-erodable mud plasters with different soil stabilizers such as cement, linseed oil, bitumen and bhoosa etc.

Rajasthan Government.

Different samples of river sands and stone and aggregates mainly used in buildings as well as different types of stones available in Rajasthan, such as marble stones and Bharatpur red stone, are shown by the Government of Rajasthan.

Government of Madhya Pradesh.

The Government of Madhya Pradesh bring out the use of bamboo reinforcement for pre-cast slabs and the use of bitumen mixed compound for heat proofing.

Hindustan Housing Factory.

Different types of precast, prestressed beams for spans upto 14 feet with filler slabs of foam concrete, ordinary plain concrete and lightly reinforced cement concrete slabs for construction of floors and roofs in buildings, are shown by the Hindustan Housing Factory, Delhi.

They also exhibit prestressed lightly reinforced fencing post and wall panels and show unreinforced cement concrete pipes of different diameters for use in storm-water drainage.

Bikaner Gypsums Ltd.

The Bikaner Gypsums Ltd. show the use of floor tiles, jallies, hollow blocks, etc.; of gypsum quarried from Rajasthan; of different types of paints manufactured from gypsum on brick walls, concrete walls, lime plaster and asbestos cement.

Standard Brick and Tile Co.

A shed illustrates the use of hollow clay blocks for walls and floors; the use of ornamental clay tiles for false ceilings and the use of Mangalore tiles for roofing.

John P. Anderson Co.

An actual size model shows the use of light steel sections for the construction of walls and light floors. The space between the steel members is filled with light wall boards, gypsum slabs, light-weight concrete, thermo-crete and other light materials.

Universal Screws Factory.

Different types of machine and wooden screws used in buildings are shown by the Universal Screws Factory.

Asbestos Cement Co.

A full size model of a house shows the construction of sheet roofing with asbestos cement sheets.

Model Houses Section

The plans and specifications of the houses given in the following pages are those which have been constructed in the Model Houses Section of the Exhibition. The number given at the top of every page indicates plot number where the actual house is constructed. The name of the agency whether Government or private is given below the plan. The technical abbreviations used in the specifications of the plans are explained below for the convenience of the readers.

1. A.C.—Asbestos Cement
2. B.B.—Burnt Brick
3. B.W.G.—British Wire Gauge
4. C.B.R.I.—Central Building Research Institute, Roorkee
5. C.C.—Cement Concrete
6. C.I.—Corrugated Iron
7. C.M.—Cement mortar
8. C.T.—Country Teak
9. D.P.C.—Damp Proof Course
10. D.Q.—Delhi Quartzite
11. G.I.—Galvanised Iron
12. G.L.—Ground Level
13. M.S.—Mild Steel
14. R.B.—Reinforced Brick
15. R.C.—Reinforced Concrete
16. R.C.C.—Reinforced Cement Concrete
17. S.D.B.—Sun dried brick
18. W.C.—Water Closet.

INDEX TO THE HOUSES

SET UP AT THE EXHIBITION.

NOTE:—Numbers within brackets indicate plot numbers. In the Model Houses Sectio every page bears these plot numbers in thick bold type on the top.

None from Madras.

1 (a)

This is a small two-roomed house aligned at an angle of 45 degrees to the main road to ensure privacy in the front court-yard. It is built to traditional specifications with a sloping roof and is quite suitable for wet climates.

DATA

1. Floor area	. . . .	434 s. ft.
2. Plinth area	. . . .	567 s. ft.
3. Cost at Delhi	. . . .	Rs. 4,678/-/-
4. Plinth area rate	. . . .	8/4/-
5. Floor area rate	. . . .	10/12/-

(Including Cost of Services).

SPECIFICATIONS

Foundation and Plinth—2′-6″ deep 9″ thick lime concrete using 1½″ gauge D.O. ballast. 2nd brick work in CM 1:6. 1″ thick CC 1:2:4 damp proof course.

Superstructure—2nd class brick in CM 1:6. Partition, 4½″ thick in CM 1:4 Brick arches over door and window openings.

Doors and windows—Soft wood doors and windows, with battens and braced shutters and iron fitting.

Roof—G. I. Sheet roofing 24 B.W.G. with thatch and fixed with bamboo reepers.

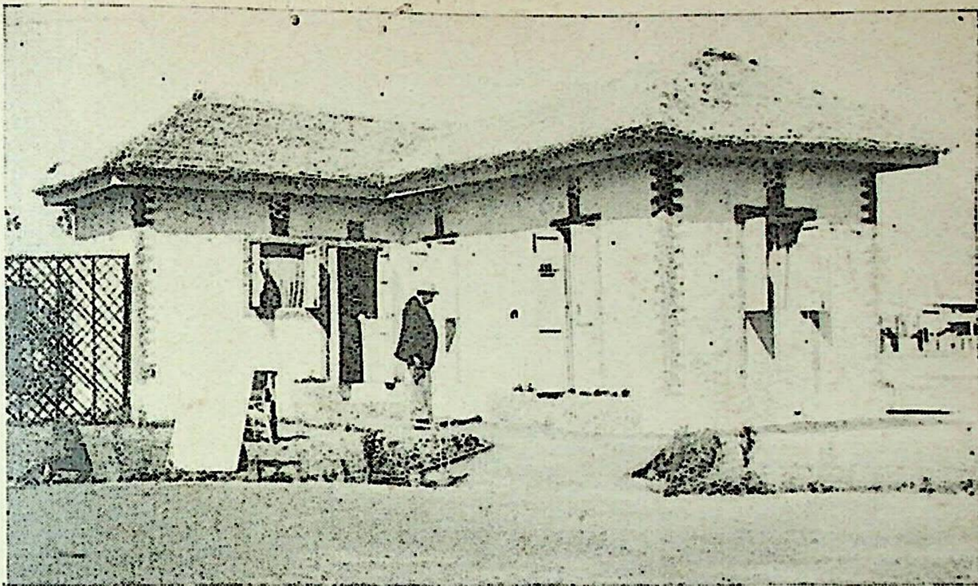
Finishing—½″ thick cement plaster in 1:6 mortar with white washing inside, colour washing outside painting wood work.

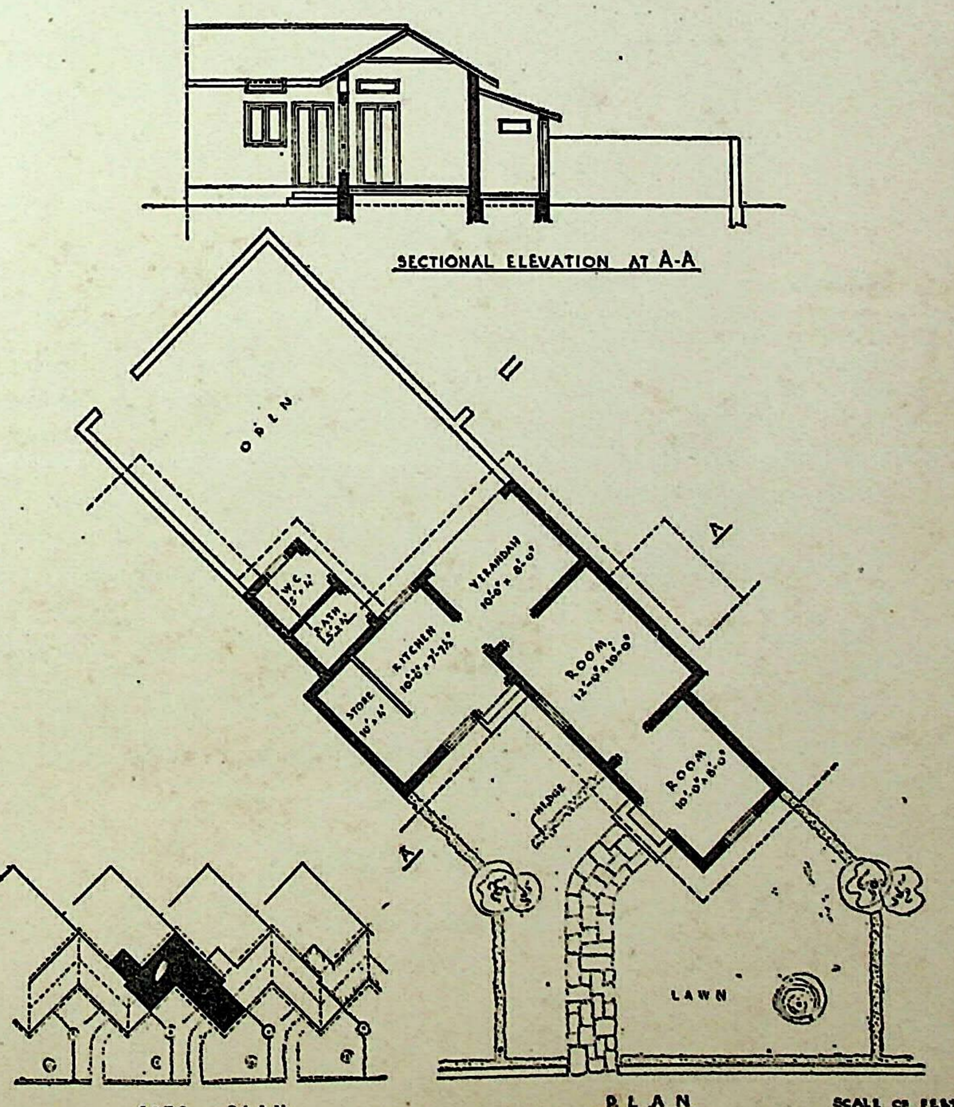
Flooring—1″ cement concrete 1:2:4 and finished with a floating coat of neat cement.

Services—Indian type water closet water supply and electricity.

Special Feature

1. The building is aligned at 45° to the road for variety and some privacy in the Courtyard.





1 (a) CENTRAL P.W.D. MODEL HOUSE 7.

1

This, Sir, is a Plywood house. A great part of it is portable and is, therefore, well suited for camps which have to establish themselves for short periods of two or three years at each place. A very light structure, its transport costs are not high.

DATA

1. Floor area . . . . 298 s. ft.
2. Plinth area . . . . 386 „
3. Cost at ... Bombay / „ „ ... Delhi {[Including Cost of Services]} Rs. 4,314/- / Rs. 3,451/-

	Bombay Rs.	Delhi Rs.
4. Plinth area rate .	11/3/- s. ft.	9/0/- s. ft.
5. Floor area rate .	14/8/- „	11/9/- „

SPECIFICATIONS

Foundation and Plinth—2′-0″ × 2′-0″ deep foundation and 6″ thick C.C. 1:3:6 12″ of plinth Brick work in C.M. 1:6.

Superstructure—B.B. in C.M. 1:6 9″ thick up to sill of windows. Above this level the walling is of ½″ thick sheet plywood on the outside and ¼″ thick plywood panelling inside (flush inside). Fixed to teakwood posts 4″ × 4″.

Doors and Windows—1½″ thick teakwood doors and windows with plywood penalled and louvres at top and with iron fixfures and painted.

Roofing—Plywood or asbestos corrugated sloping roof on wooden purlins. Height 10′-0″ to 8′-6″.

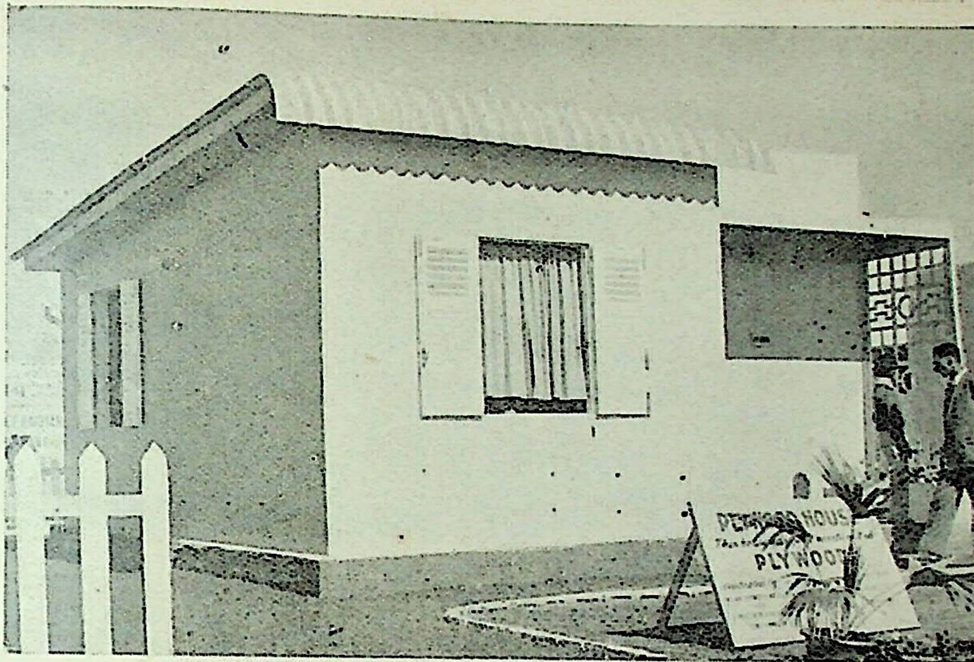
Finishing—Inside plastered with ½″ C.M. 1:3 and outside painted with cement mortar. Woodwork painted.

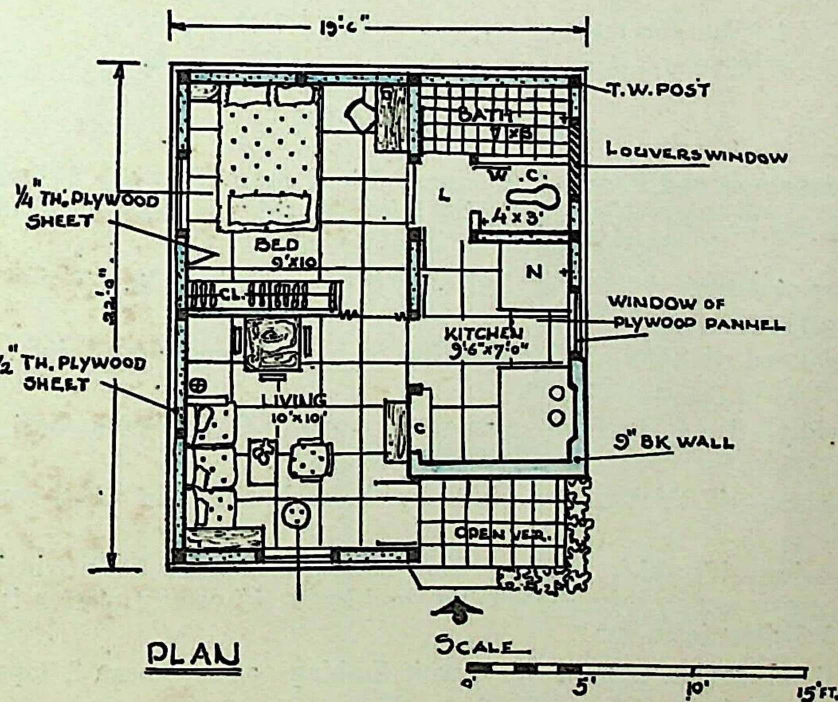
Flooring—1″ thick Indian patent stone over 4″ thick C.C. 1:4:8.

Services—2 Nos. ½″ Bibcocks and one Indian type water closet and electric installation.

Special Feature

i. A portion of the superstructure and the roof are of plywood boardings.





1.—INDIAN PLYWOOD Co.

2

This is a well planned flat-roofed house put up by the Central Public Works Department. The big compound is a feature worth particular observation. The platform outside makes the house particularly suitable for low-rainfall regions.

DATA

1. Floor area . . . . . . 420 sq. ft.
2. Plinth area . . . . . . 567 sq. ft.
3. Cost at Delhi . . . . . Rs. 4,391
   (including the cost of services).

	Delhi Rs. a.	
4. Plinth area rate	7 12	sq. ft.
5. Floor area rate	10 7	sq. ft.

SPECIFICATIONS

Foundations and Plinth—2′-6″ deep. Lime concrete with 1½″ gauge Delhi quartzite stone metal. 9″ thick brick in C.M. 1:6. Plinth 1′-0 above ground level. ½″ thick damp proof course in C.M. 1:3.

Superstructure—9″ thick. 2nd class brick work in C.M. 1:6 and half brick in partitions in C.M. 1:4.

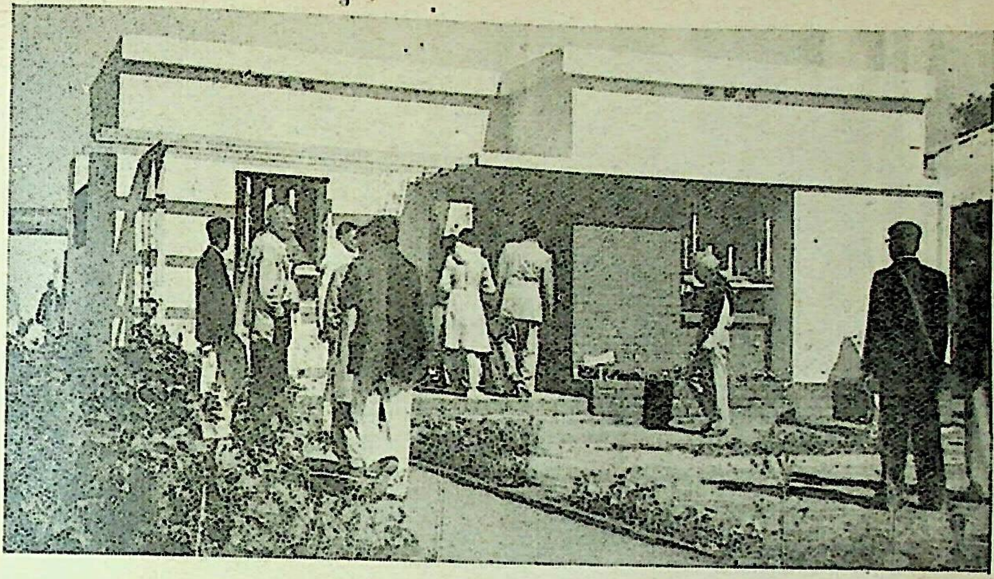
Doors and windows—1¾″ thick softwood battened and braced doors and 1½″ thick fully glazed windows.

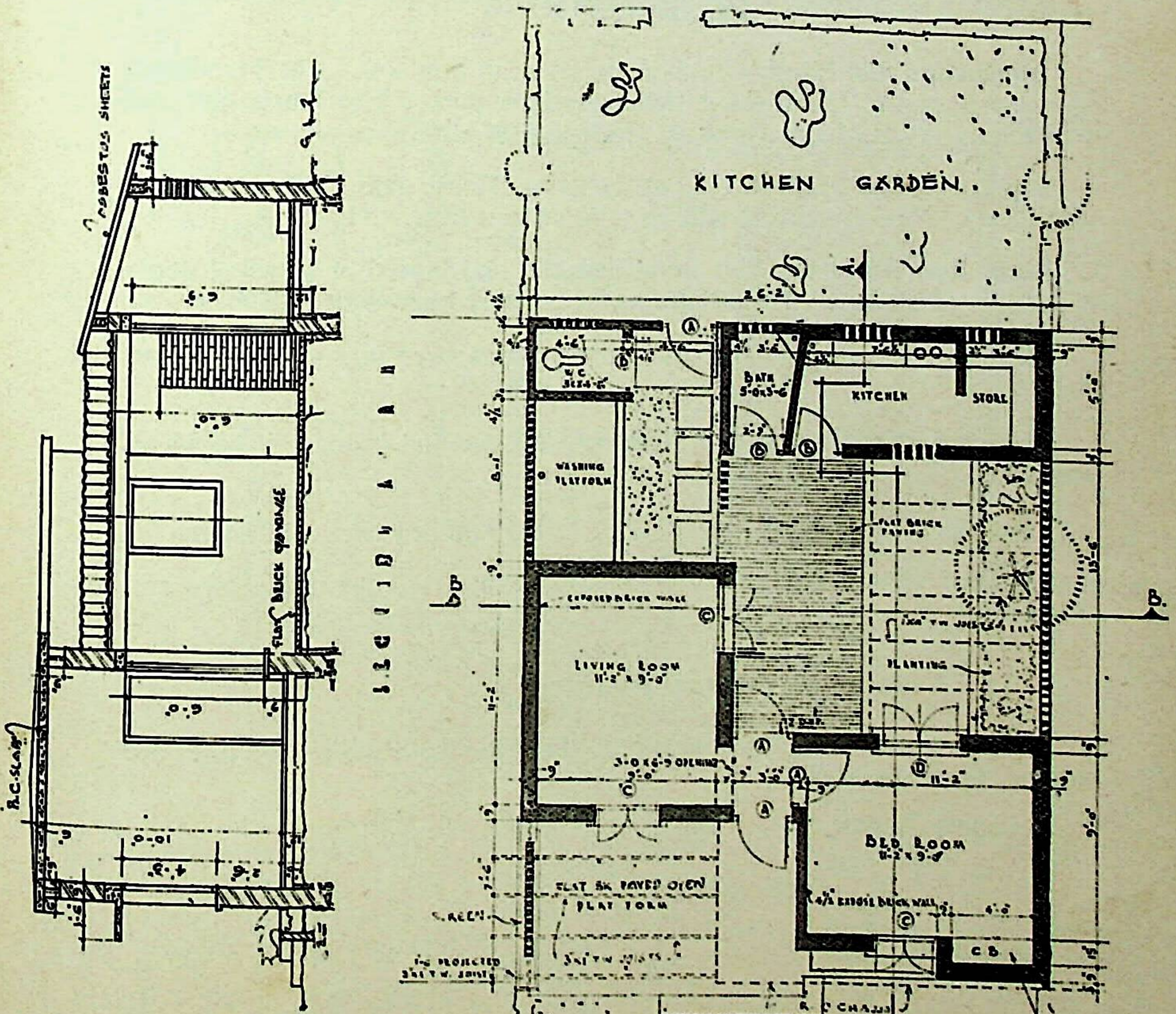
Roofing—R.C.C. roof for main rooms and W.C. asbestos sheet roof for the kitchen.

Finishing—½″ thick cement plaster with CM 1:6. The wood work is painted.

Flooring—1″ thick cement concrete 1:2:4 flooring over a bed of 1:5:10 cement concrete in kitchen, WC and bath. ½″ cement plaster 1:6 on 3″ brick ballast in rooms.

Services—Indian pattern W.C. with flushing arrangement 3 taps, 60 gallons water tank.





2—CENTRAL P.W.D. MODEL HOUSE (3)

3

A spacious house suitable for hot and humid regions. The design achieves the maximum results of good ventilation.

DATA

1.	Floor area	576 sq. ft.
2.	Plinth area	668 sq. ft.
3.	Cost at Delhi	Rs. 4,835/-/-
4.	Plinth area rate	Rs. 7/4/- s. ft.
5.	Floor area rate	Rs. 8/6/- s. ft.

(Including cost of services)

SPECIFICATIONS

Foundation and Plinth—Foundation taken to firm soil. The foundation concrete is of CC 1:5:10 using Delhi quartzite stone. The foundation and plinth masonry is of Brickwork 9″ thick in C.M. 1:6.

Superstructure—Hollow cement concrete block masonry in cement mortar 1:5. The top course will be solid cement concrete blocks.

Doors and Windows—Soft wood battened and braced or panelled doors with salwood frames. The windows will be glazed and with M.S. bars.

Roofing—Corrugated Asbestos cement sheets over salwood rafters and trusses.

Finishing—The outside will be cement washed and inside will be white-washed.

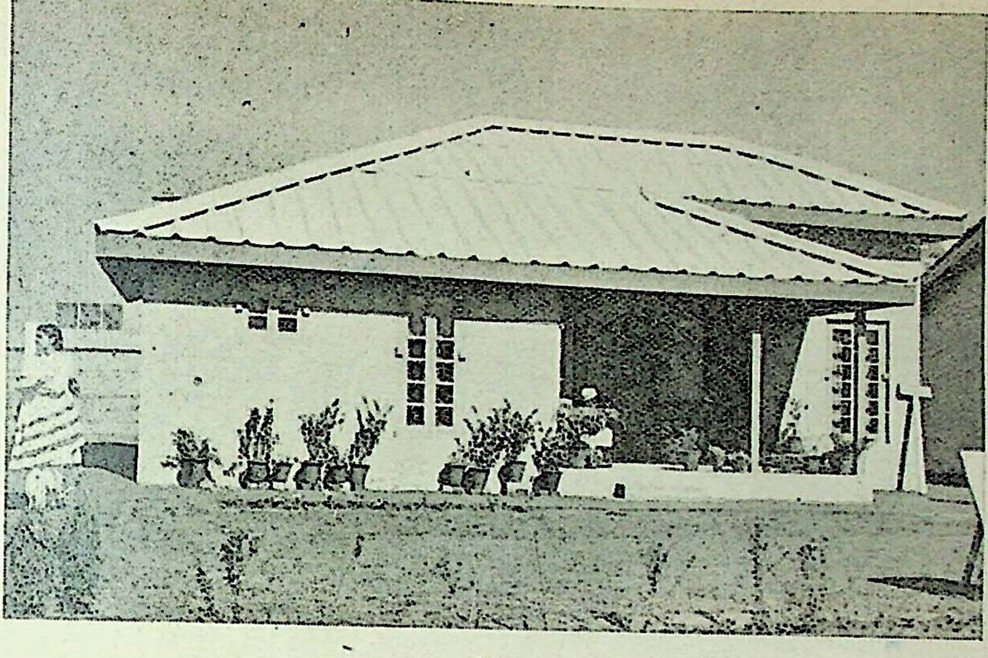
Flooring—1″ CC 1:2:4 over 3″ C.C. 1:5:10 rammed over sand filling.

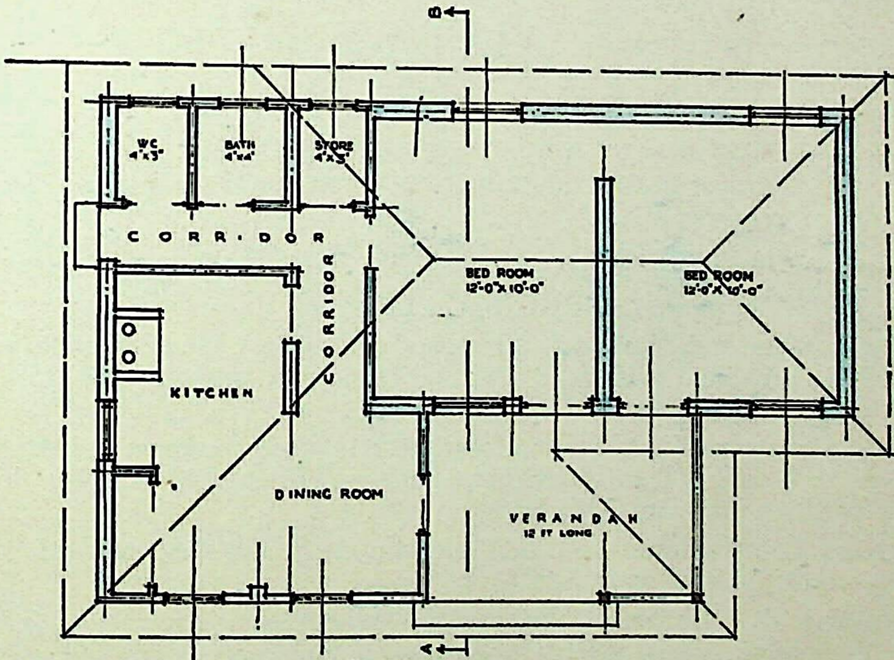
Services—Indian WC glazed with flushing tank, storage tanks, taps and electricity.

Special Features

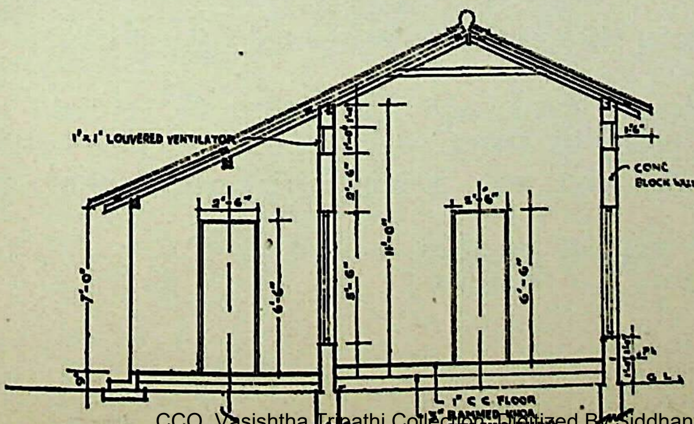
1. Hollow block cement concrete 8″ thick for main walls. 4″ thick for internal partition walls.

2. Dining Room.



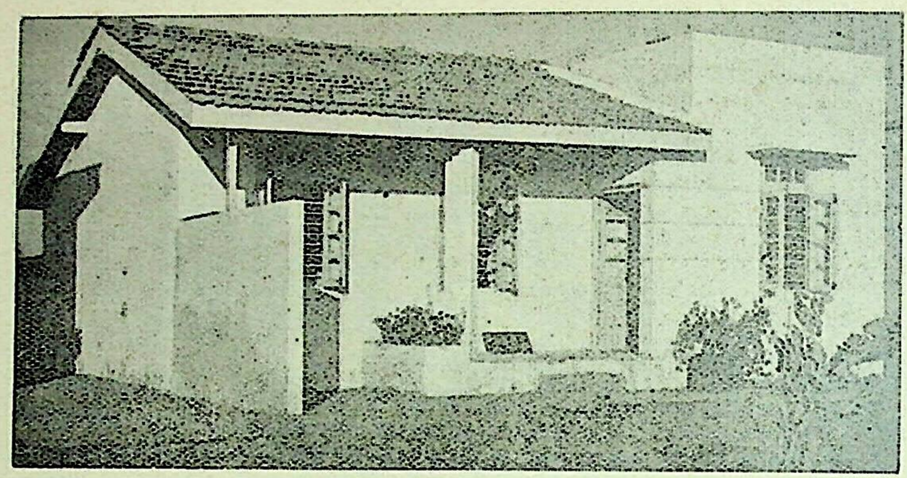


PLAN



3.—CENTRAL P. W. D. MODEL HOLLOW BLOCK

SECTION AT AB



Hot and Humid Region—President's Award, First Prize, Gold Medal.

DATA

1. Floor area	572 s. ft.
2. Plinth area	686 s. ft.
3. Cost at Delhi	Rs. 5,600/-/-
4. Plinth area rate	Rs. 8/3/- s. ft.
5. Floor area rate	Rs. 9/13/- s. ft.

SPECIFICATIONS

Foundation and Plinth—3′-0 deep and 2′-0 wide. Lime concrete with brick ballast in lime mortar 1:3. Second class brick work in C.M. 1:7. ½″ thick damp proof course of C.M. 1:3.

Superstructure—Brick work in mud mortar, except corners jambs, 1′-0 at floor level and 1′-0 below ceiling, which will be in C.M. 1:6 4½″ thick brick partition walls in C.M. 1:4.

Doors and Windows—1½″ thick salwood doors and windows with iron fittings—with fanlight or louvers.

Roofing—R.C.C. roof 4½″ thick with 4″ average lime concrete. Mangalore tile roofing over wooden scantlings over Bed room, store and dining verandah.

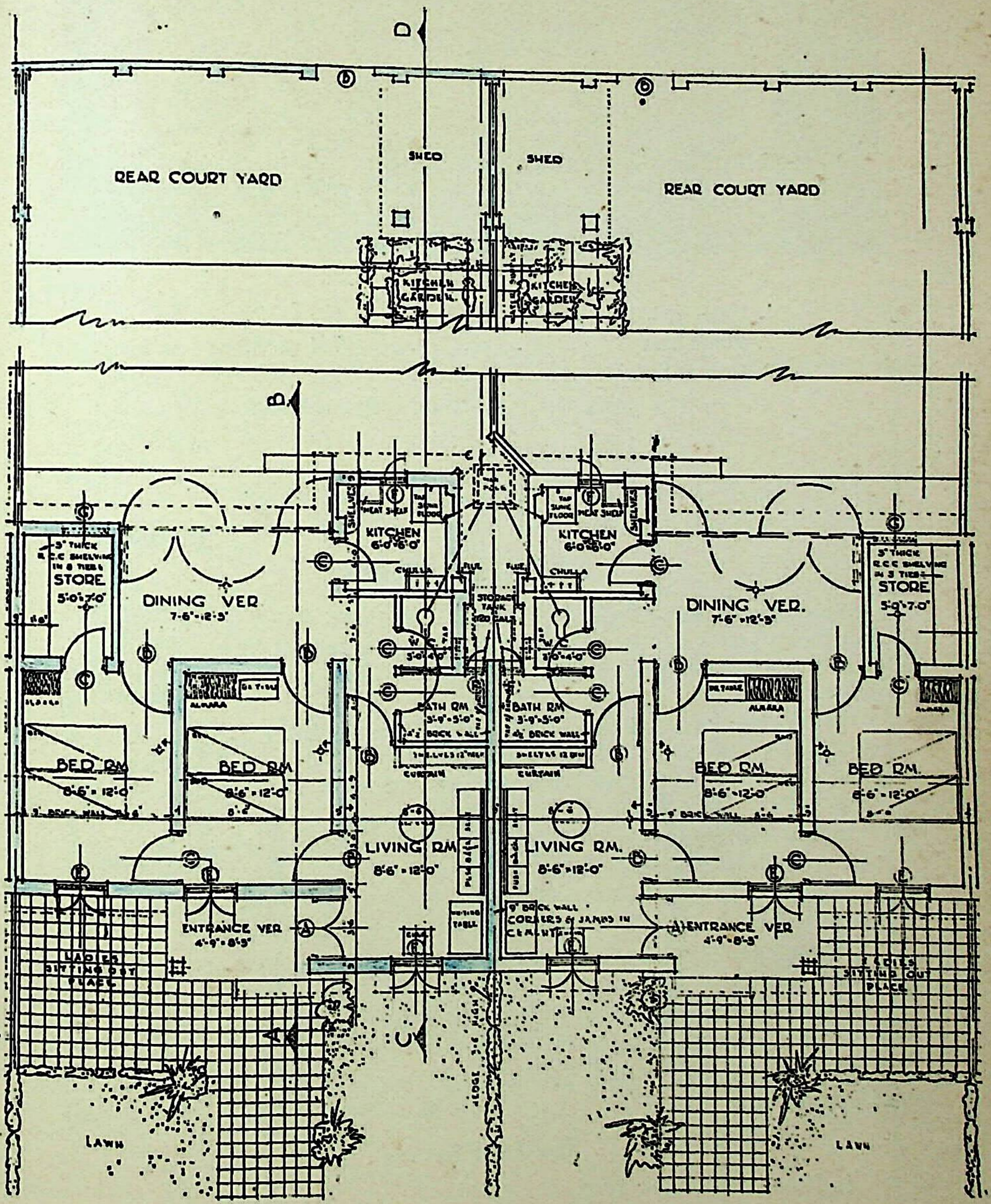
Finishing—½″ thick cement plaster 1:6 and white washed. Wood work painted with solignum.

Flooring—1″ cement concrete flooring with CC 1:2:4 over a bed of 3″ thick lime concrete using brick ballast.

Services—Indian type water closet with flushing arrangement, water taps and electricity.

Special Feature

General planning.



4.—COMPETITION DRAWING FOR HOT AND HUMID REGION (Design by V. J. Mistry).

5

A good small house, put up by the Government of Uttar Pradesh. The roof consists of reinforced brickwork which is not common in other parts of India.

DATA

1. Floor area	. . . .	606 sq. ft.
2. Plinth area	. . . .	744 sq. ft.
3. Cost at Delhi	. . . .	Rs. 5,100

[Including cost of courtyard compound wall].

		Delhi Rs. a.
4. Plinth area rate	. . . .	6 14 s. ft.
5. Floor area rate	. . .	8 7 „

SPECIFICATIONS

Foundations and Plinth—1′-9″ deep and 1′-6″ wide. Lime cement. Concrete 9″ thick in foundation using ½ lime: 1 cement: 6 sand: 12 brick ballast. 2nd class brick work in CM 1:6. ¾″ thick damp proof course of CM 1:3.

Superstructure—2nd class brick work in mud plaster with mortar for all walls except jambs of doors and windows. Sills, back of almirahs, pillars one foot below roof level, parapets and steps which will be in CM 1:6 precast R.C.C. lintles.

Doors and Windows—1½″ thick deodar wood panelled doors and glazed windows with iron fittings.

Roofing—1st class reinforced brick work slabs in 1:3 cement mortar for rooms and varandah. 3″ thick R.C.C. slab for bath and W.C.

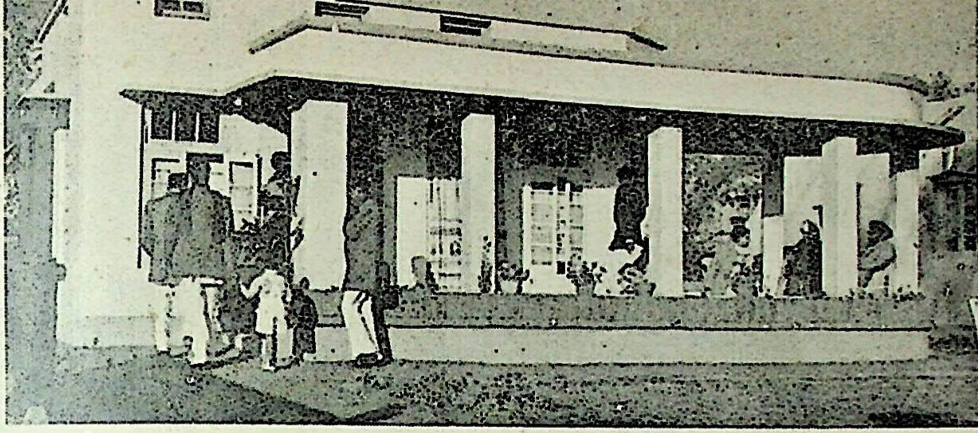
Finishing—½″ thick plaster with CM 1:6 and white-washed. All wood work painted.

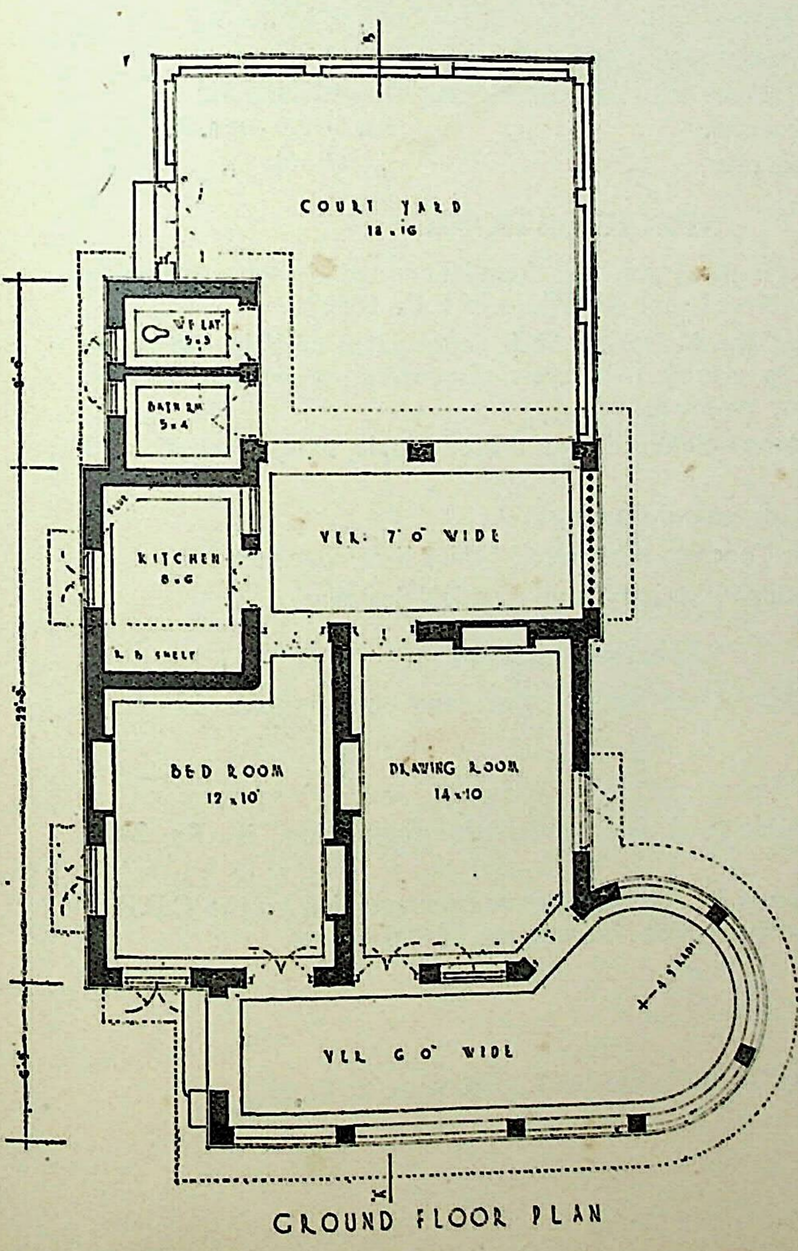
Flooring—Flooring is of 1″ C.C. 1:2:4 laid in panels on a bed of 3″ thick lime concrete in brick ballast.

Services—6 electric light points, 2 fan points, 4 taps, Flushed latrine and soak pit.

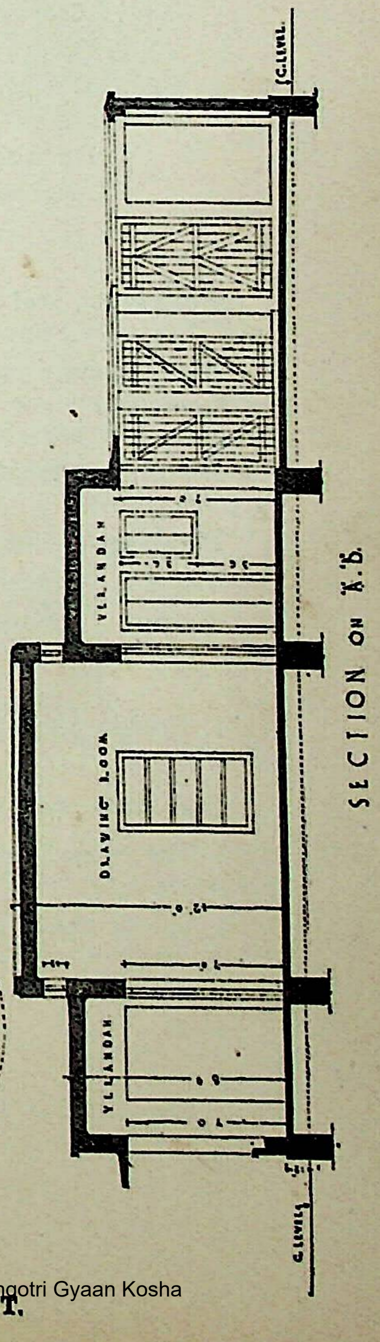
Special Feature

1. Reinforced brick roof.





GROUND FLOOR PLAN



5.—UTTAR PRADESH GOVERNMENT.

6

These are four cheap houses put up by the Central Building Research Institute, Roorkee. The material used for the shell is thin cement plaster over Hessian cloth.

DATA

1. Floor area	. . . . . .	. 915 s. ft.
2. Plinth area	. . . . . .	. 994 „
3. Cost at Delhi	. . . . . .	Rs. 4,548 Delhi
4. Plinth area rate.	. . . . .	Rs. 4/10/0 per s. ft.
5. Floor area rate	. . . . .	„ 4/15/0 „

SPECIFICATIONS

Foundation and Plinth—Plain strip foundation under each springing of 21″ × 18″ section for ordinary conditions in C.C. 1 : 5 : 10.

Superstructure and Roof—Double Shell corrugated arch in the shape of a catenary made by placing thin layers of concrete on hessian. Single shell for two bays for verandah.

Doors and Windows—Battened and braced single hung doors and glazed windows.

Finishing—White or colour-washing.

Flooring—Cement Concrete 1:2:4 over 3″ thick lime concrete.

Services—Water-supply, sanitary and electrical installation.

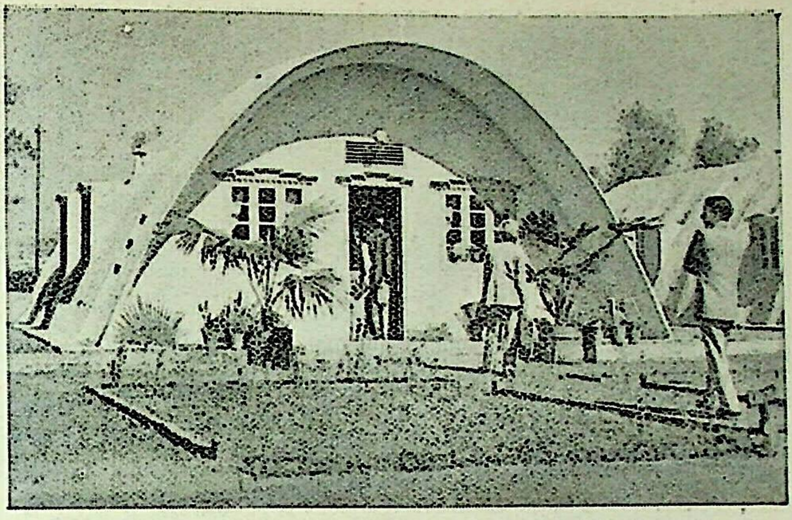
Special Features

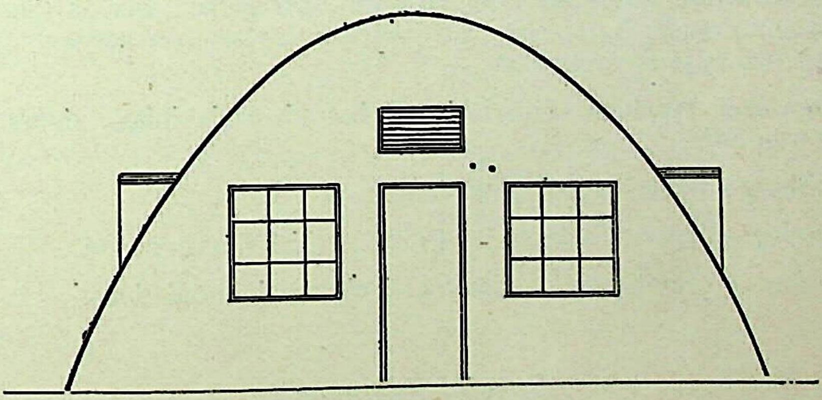
1. Double Shell with 2″ insulation gap and constructed in bays of 4′-6″.

2. Dormer windows.

3. The cost of double shell, floor and strip foundation is Rs. 2-8-0 per sq. ft.

4. The figures of costs for this house have been supplied by the C.B.R.I. on the basis of mass construction, *i.e.* a group of 200 houses.





6.—CENTRAL BUILDING RESEARCH INSTITUTE—ROORKEE.

7

DATA

1. Floor area	. . . . .	864 s. ft.
2. Plinth area	. . . . .	911 „
3. Cost at Delhi	. . . . . .	Rs. 4,078/-
		Delhi
4. Plinth area rate	. . . .	Rs. 4/8/0 per s. ft.
5. Floor area rate	. . . . .	„ 4/12/0 „

SPECIFICATIONS

Foundation and Plinth—Plain strip foundation under each springing of 21″ × 18″ section in C.C. 1:5:10 for ordinary conditions.

Superstructure and Roof—Double Shell corrugated arch in the shape of a catenary made by placing thin layers of concrete on hessian. Single shell for two bays for verandah.

Doors and Windows—Battened and braced single hung doors and glazed windows.

Finishing—White or colour-washing.

Flooring—Cement Concrete 1:2:4 over 3″ thick lime concrete.

Services—Water-supply, sanitary and electrical installations.

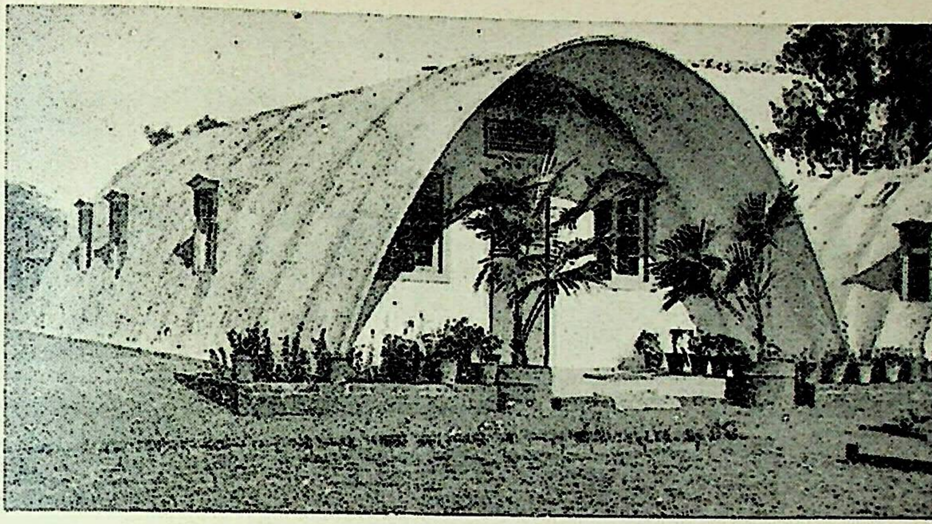
Special Features

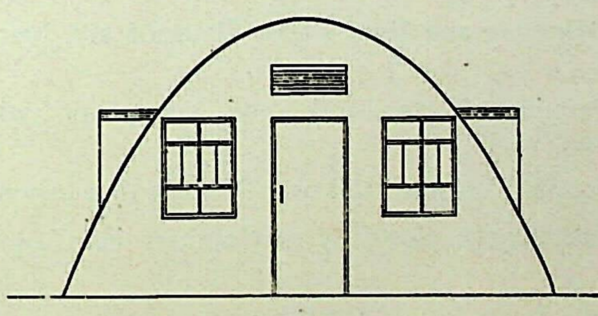
1. Double Shell with 2″ insulation gap between and constructed in bays of 3′-4″.

2. Dormer windows—span of Shell 20′-0″.

3. The cost of double shell, floor and strip foundation is Rs. 2-8-0 per sq. ft.

4. The figures of costs for this house have been supplied by the C.B.R.I. on the basis of mass construction, i.e. a group of 200 houses.





7.—CENTRAL BUILDING RESEARCH INSTITUTE—ROORKEE.

8

DATA

1. Floor area	584 s. ft.
2. Plinth area	657 ,,
3. Cost at Delhi	Rs. 2,984/ Delhi
4. Plinth area rate	Rs. 4/9/0 per s. ft.
5. Floor area rate	,, 5/2/0 ,, ,,

SPECIFICATIONS

Foundation and Plinth—Plain strip foundations under each springing of 21″ × 18″ section in C.C. 1:5:10 for ordinary conditions.

Superstructure and Roof—Double Shell corrugated arch in the shape of a catenary made by placing thin layers of concrete on hessian.

Doors and Windows and Roof Light—Battened and braced door and glazed windows.

Finishing—Painting of woodwork and colour or white washing the superstructure.

Flooring—Cement Concrete 1:2:4 over 3″ thick lime concrete.

Services—Water-supply, electricity and sanitary installations.

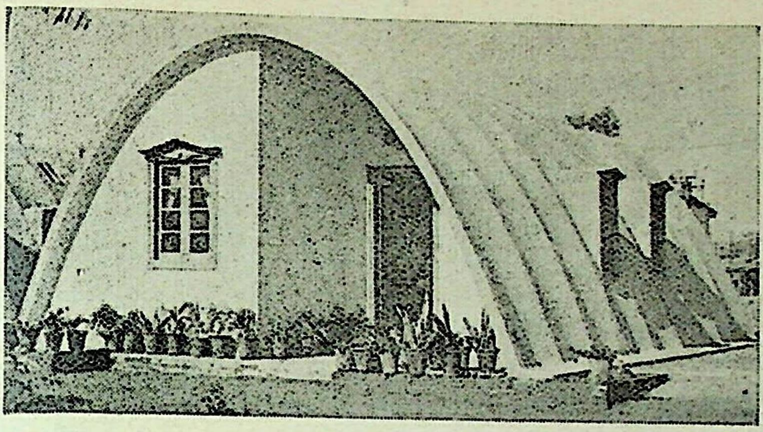
Special Features

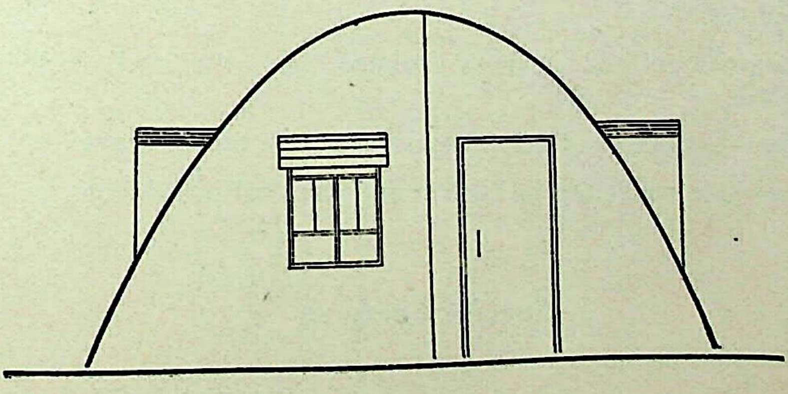
1. Double Shell with 2″ insulation space between them. Laid in bays of 3′-4″—9 bays.

2. Dormer windows on sides.

3. Span of Shell 20′-0″. The cost of double shell, floor and strip foundation is Rs. 2-8-0 per sq. ft.

4. The figure of costs for this house have been supplied by the C.B.R.I. on the basis of mass construction *i.e.*, a group of 200 houses.





8.—CENTRAL BUILDING RESEARCH INSTITUTE—ROORKEE.

9

Same as 6, 7, 8

DATA

1. Floor area	513	s. ft.
2. Plinth area	546	,,
3. Cost at Delhi	Rs. 1547/- Delhi	
4. Plinth Area rate	Rs. 2/13/0 per s. ft.	
5. Floor area rate	,, 3/1/0 ,,	

SPECIFICATIONS

Foundation and Plinth—Plain strip foundations under each springing of 21″ × 18″ in C.C. 1 : 5 : 10 for ordinary conditions.

Superstructure and Roof—Single thin corrugated arch in the shape of a catenary made by placing thin concrete in layers on hessian.

Doors and Windows and Roof Light—Battened and braced doors and glazed windows.

Finishing—Doors and windows painted and the shell colour or white washed.

Flooring—Cement Concrete 1:2:4 over 3″ thick lime concrete.

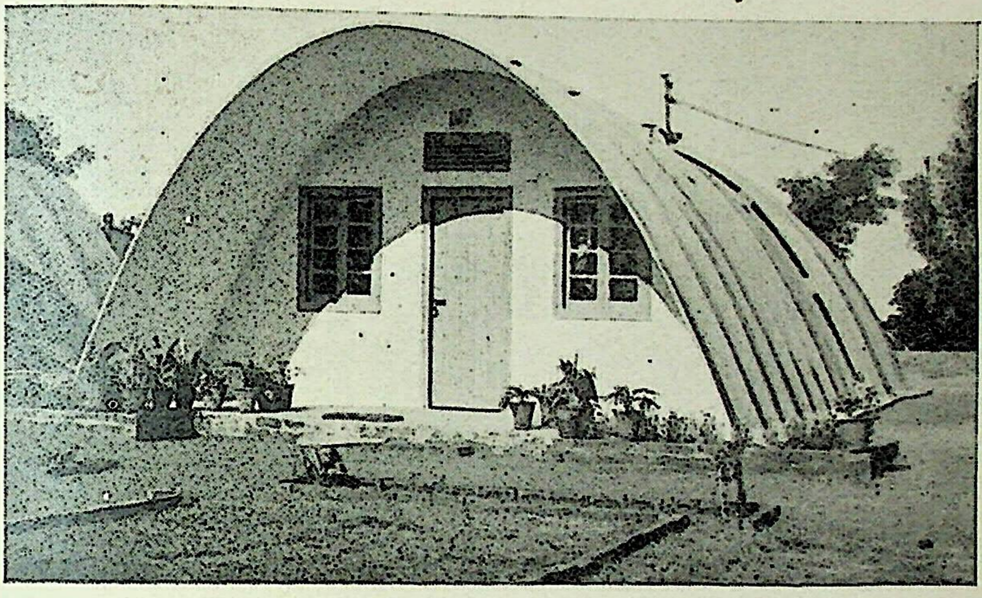
Services—One water tap in kitchen and electrical installation.

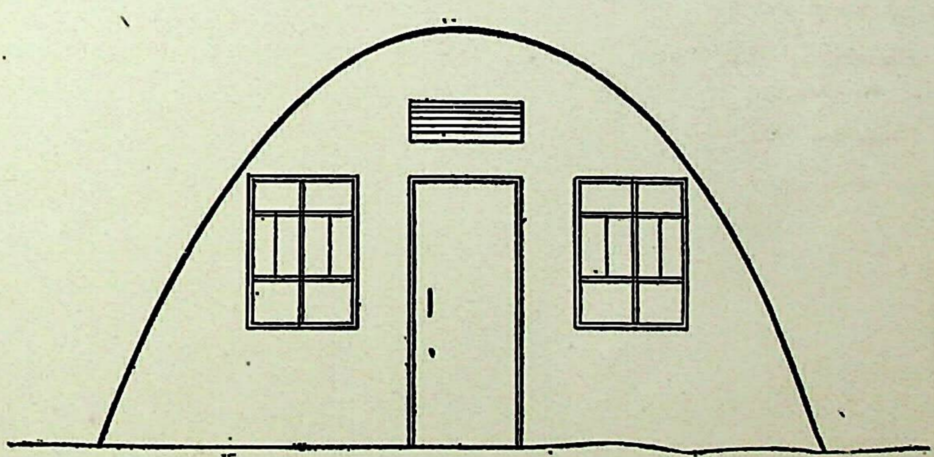
Special Features

1. The roof and wall of single shell concrete laid in layer on hessian.

2. 8 bays of 3′-4″ each—span of hell 20′-0″. The cost of single shell, floor and strip foundation is Rs. 1-12-0 sq. ft.

3. The figures of costs for this house have been supplied by the C.B.R.I. on the basis of mass construction *i.e.*, a group of 200 houses.





9.—CENTRAL BUILDING RESEARCH INSTITUTE—ROORKEE.

10—11

The growing house is designed for families with modest incomes who can only incur the minimum unavoidable expenditure on putting up houses for themselves. This house is a "growing" house. It is primarily a rural type but is also suitable for semi-urban areas. The planning and the use of materials in different stages have been very carefully evolved with this objective of making the modest looking initial tenement, grow up into a durable spacious and well laid-out house. The complete house costs less than twice the average annual income of an Indian family; and the first stage is a limited contribution—the only possible one at that stage within the resources of the family—towards the gradual and definite realisation of the ultimate objective.

B.—DATA

	Stage 1	Stage 2	Stage 3	Stage 4
1. Total cost including Cattle Shed	The actual costs of this first Experimental unit has not been worked out.			
2. Total floor area . . .	357 s. ft.	395 s. ft.	598 s. ft.	452 s. ft. (No Cattle Shed)
3. Total plinth area . . .	400 s. ft.	483 s. ft.	726 s. ft.	554 s. ft. (No Cattle Shed)

C.—SPECIFICATIONS

	Stage 1	Stage 2	Stage 3	Stage 4
1. Foundation up to plinth (all stages)	9" burnt brick ballast in lime concrete under pillars and 6" under walls. 9" foundation walls of burnt brick in lime mortar on 13½" footings.			
2. Superstructure : pillars	BB in lime mortar except top 2' in cement mortar for holding-down bolts.			
Walls	Sun-dried bricks in mud mortar.	Sun-dried bricks in mud mortar.	1 room BB in lime. 1 room SDB in mud.	All rooms BB in lime mortar.
3. Openings : Doors	Exterior battened and braced, doors abutting masonry with jaffri doors to courtyard.			
Windows	Honeycomb BB in lime.	Honeycomb BB in lime.	1-3 section batten; 1-2 section batten;	2-3 section glazed & batten-cum-table.

Carried over.

Contd.

4. Roofing		Thatch	Galvanised Iron Sheets	Asbestos-Cement Sheets	AC sheets.
5. Wall finishing.	Internal	Whitewash	Whitewash	Whitewash	Lime plaster.
	External	Gobri *leeping* over mud plaster.	Bitumenized mud plaster.	1 room exposed BB 1 room bitumen-mud	Exposed BB in lime mortar.
6. Flooring in	Rooms	Gobri *leeping* over rammed earth	Bitumen stabilized rammed earth	1 Cement concrete 1 flat BB sand fill	Cement concrete.
	Kitchen	As above with cement sink	As above with cement sink	Cement concrete	Cement concrete.
7. Services.	Water	Common Hand pump or tap in court for four families.			
	W. C's.	Pit latrine	Pit latrine	Water-borne	Water-borne.
	Elect.	None	None	One point	Four points.

8. D. Special Features

1. Four stages for expanding floor area and converting from semi-pucca to fully pucca structure.

2. Low initial cost of first stage owing to use of kacha materials and occupants' labour on non-loadbearing wall panels which may be earth in hot and dry areas or bamboo in hot and wet areas.

3. Brick-on-edge walls as well as kacha bricks to reduce demand for burnt brick and permit greater number of houses to be built from limited coal shipments and distributes the demand over a period of years. Use of cement and steel is held to a minimum.

4. Overhead storage provided in first rooms; built-in almirahs replace kacha panels between pillars.

5. Kitchens of four houses built around common court, allows shared water supply and minimizes contamination from cattle sheds and W.Cs.

6. Kitchen arrangement provides all facilities within arm's reach and includes evaporative cooler type of food safe.

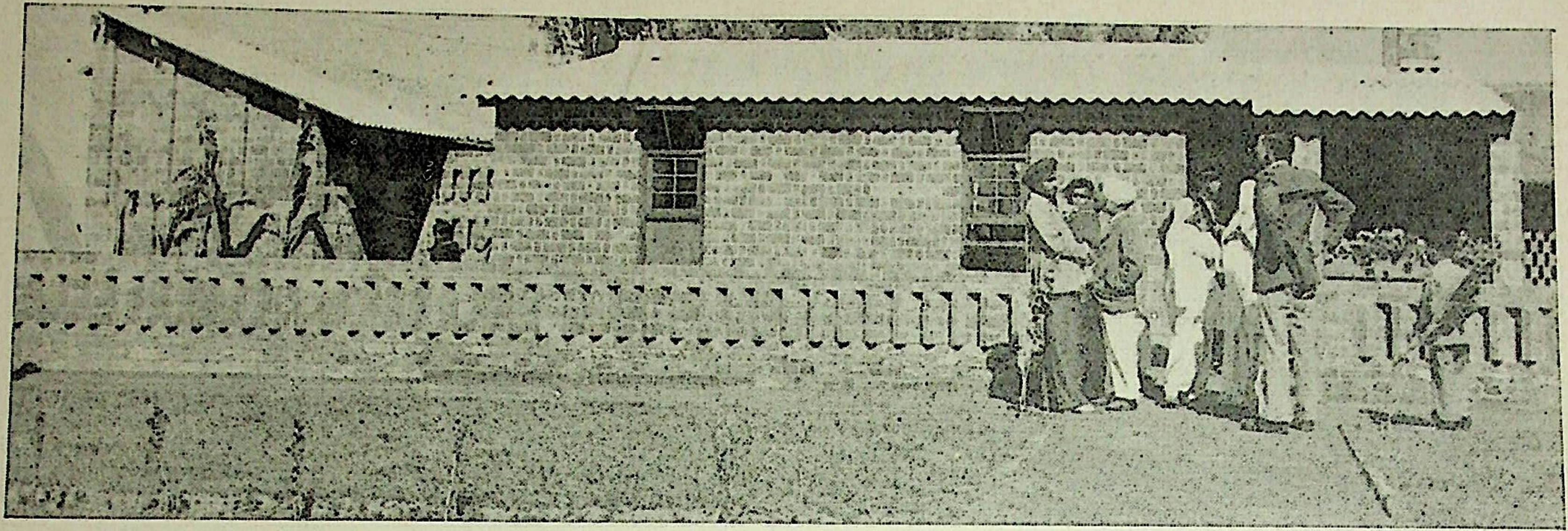
7. Adjustable shutter near ridge removes hot air and gives cross ventilation in back-to-back rooms. Batten windows in pucca stage serve as sunshades, ventilation deflectors and writing table.

8. Termite control methods are demonstrated.

9. Cattle sheds, sanitary facilities, lighting and furnishing are all shown with stage-wise improvements related to house cost.

[TURN OVER FOR DRAWINGS.]

GROWING HOUSE



INDEX TO SYMBOLS OF LAYOUT PLAN

SUN DRIED BRICK WALL MUD PLASTERED......

S.D. Br. WALL WITH BITUMENIZED MUD PLASTER....

SOLID BURNT-BRICK WALL OR PILLAR............

HOLLOW BURNT-BRICK WALL........................

VENTILATED PRIVACY WALL..........................

PANEL WALL (3" OVER 9")...........................

HONEYCOMB WINDOW...

BATTEN & GLAZED WINDOW IN 3 SECTIONS.... W

BATTEN WINDOW IN 2 SECTIONS (STAGE III)..... W1

EARTH FLOOR....................................

BITUMEN STABILIZED EARTH FLOOR............

FLAT B.Br. FLOOR WITH BITUMEN-MUD MORTAR......

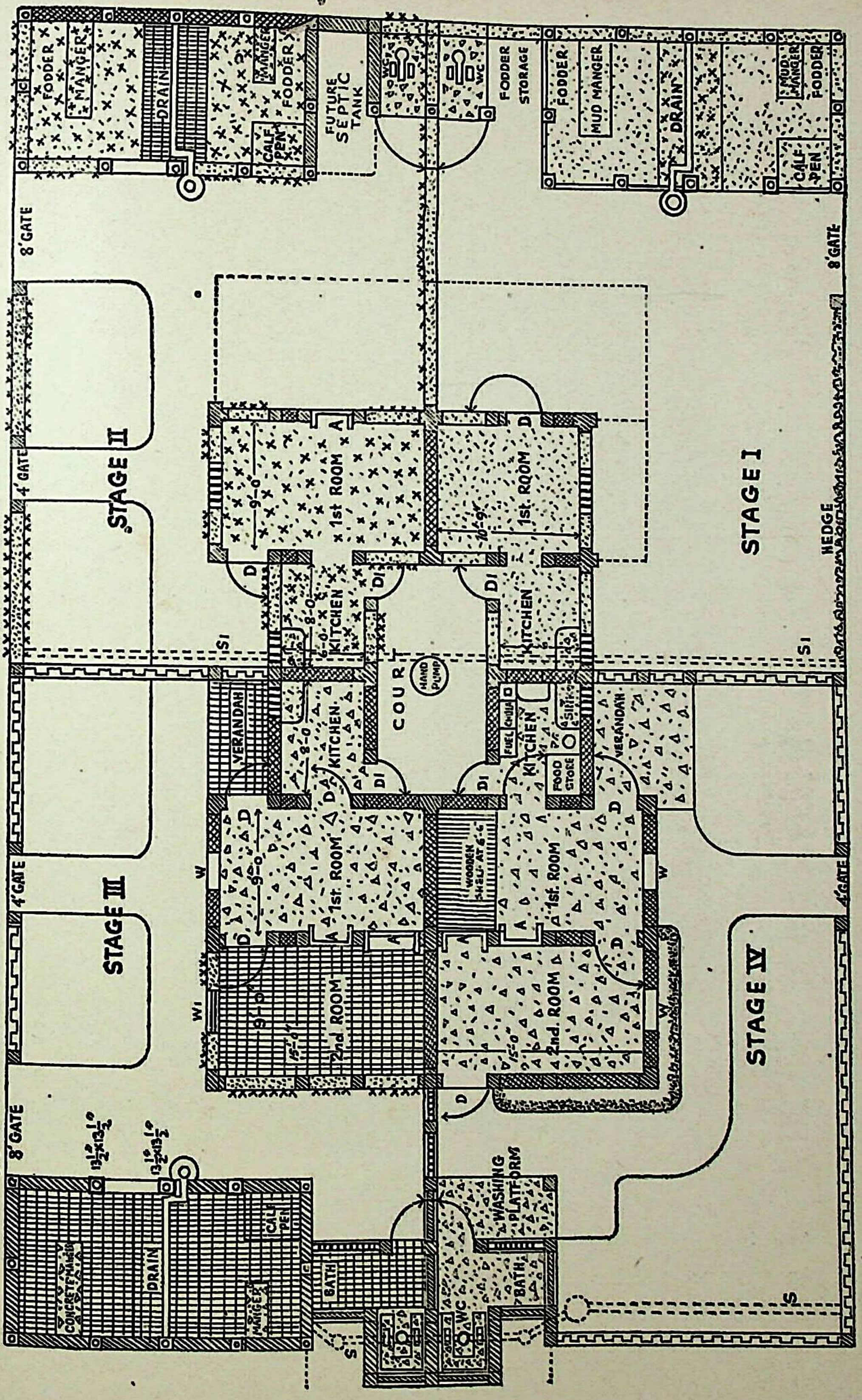
CEMENT CONCRETE......................................

BATTEN DOOR.................................... D

JAFFRI DOOR.................................... D1

ALMIRAH .. .. A

DRAINS (S=SEWAGE, S1 = SULLAGE)...........



LAY-OUT PLAN

10.-11.—GROWING HOUSE

12

The Government of Hyderabad have put up this house and the roof is based on three different techniques of construction. If you are interested, go in and find out.

DATA

(Hot & Dry).

1. Floor area . . . . 432 s. ft.
2. Plinth area . . . . 637 s. ft.
3. Cost as per Hyderabad Government {excluding the cost of services} Rs. 3,570/-

   Cost as per Delhi Schedule of rates . . Rs. 4,100/-

	Hyderabad Rs.	Delhi Rs.
4. Plinth area rate	5/9/6	6/7/-
5. Floor area rate	8/4/-	9/8/-

SPECIFICATIONS

Foundations and Plinth—Foundation will consist of Rubble stone in stabilized earth with 5% cement. Plinth is 2nd class brick work in 1:1:9 (1 lime : 1 cement : 9 sand). No damp proof course.

Superstructure—2nd class brickwork in mud mortar. 13½″ walls in main rooms and 9″ in bath W.C. and Compound.

Doors and Windows—C.T. wood doors and windows with plain Asbestos sheet panelling, size of frame 3″ × 3″, shutters 1¼″ thick.

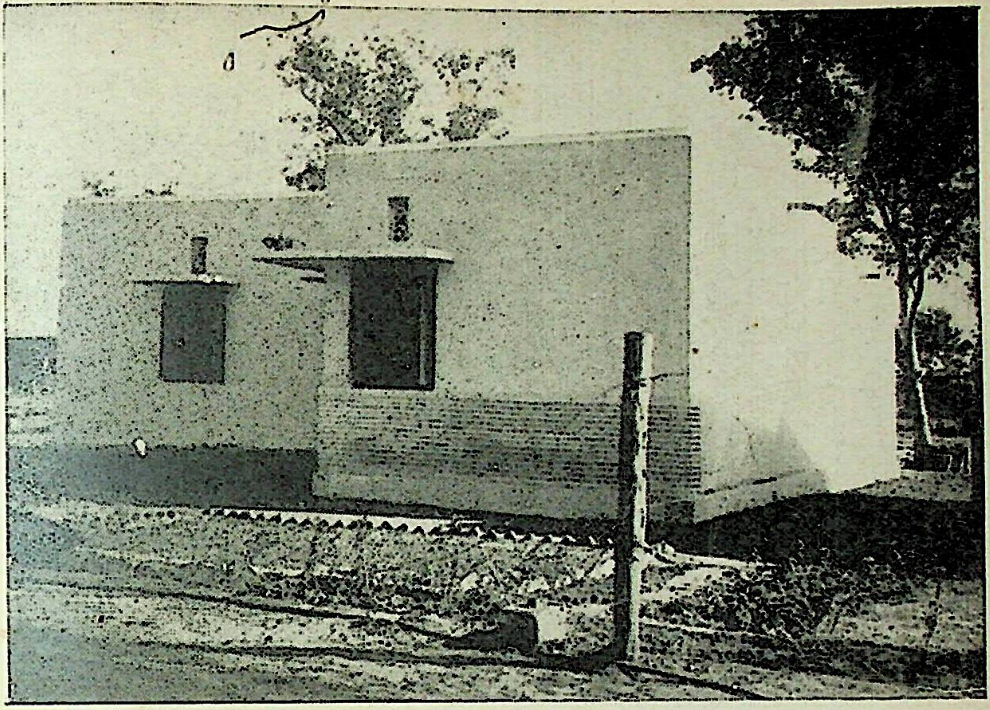
Roofing—(a) Precast beams with brick filling over sitting room. passage and bed room. (b) Stabilized tile roofing (Datta pattern roof) over verandah, bath and W.C. (c) Madras terrace roof over R.C.C. precast rafters over kitchen.

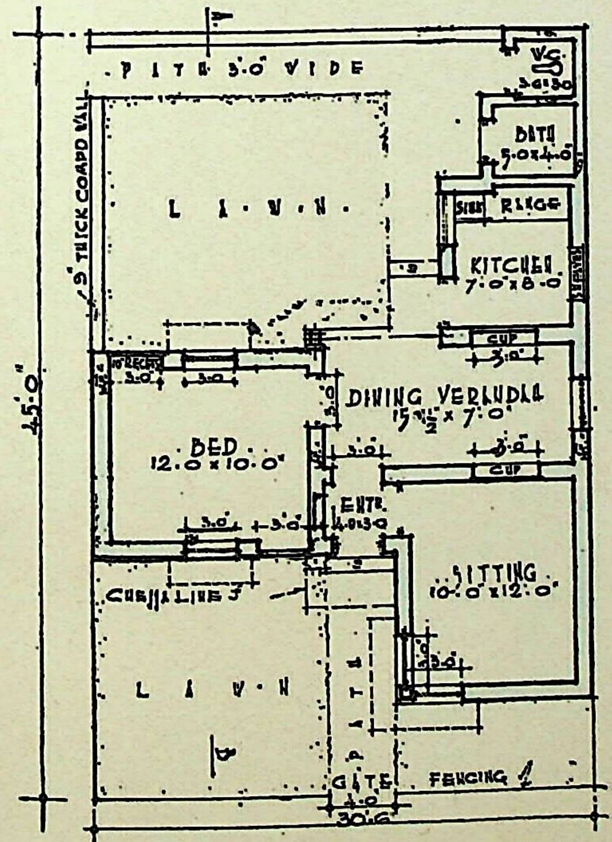
Finishing—Cement plastering 1:1:9 with two coats of colour washing both inside and outside.

Flooring—Cement flooring 1″ thick with 1:10 proportion fine finish over 3″ bed of stabilized earth mixed with 5% cement.

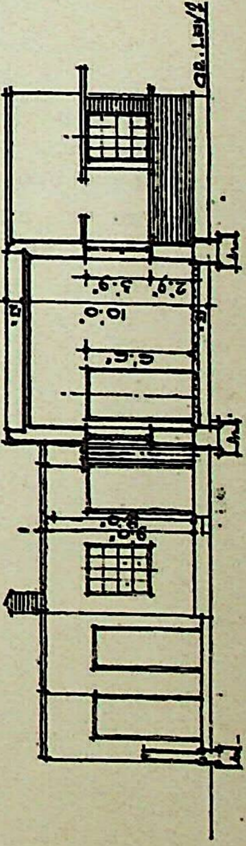
Special Features

1. Stabilized earth with 5% of cement in foundations and below floors.
2. Doors have asbestos sheet panels.
3. Roofing—Precast beams with brick filing, stabilized tile and Madras terrace roof.





- PLAN -



12.—GOVERNMENT OF HYDERABAD

13

This house illustrates the reduction in cost achieved by simplicity in planning. The two rooms with a full length verandah make it very comfortable. Big windows and doors have been placed in such a manner that the house gets the maximum flow of breeze. The house is compact and is suitable for hot humid areas. The floor height is only 8′-6″. The semi-precast roof illustrates a novel construction technique.

DATA

1. Floor area . . . . . . 539 s. ft.
2. Plinth area . . . . . . 613 s.ft.
3. Cost at Delhi (including the cost of services) . Rs. 4,584/- At Delhi
4. Plinth area rate . . . . . Rs. 7/4/6 s. ft.
5. Floor area rate . . . . . Rs. 8/8/- s. ft.

SPECIFICATIONS

Foundation and Plinth—2′-0 deep foundation. 6″ thick C.C. 1:5:10 mixed class brick-work in C.M. 1:6. ½″ thick C.M. 1:3 damp proof course.

Superstructure—9″ thick mixed class brick-work in C.M. 1:6 for main walls and 4½″ thick brick-work in C.M. 1:4 for other walls.

Doors and Windows—1¾″ thick battened and braced soft-wood doors with frames. Semi-glazed and panelled windows.

Roofing—Main room roof consists of—

1. Semi-precast roof with RCC Tee-beam with 2″ thick precast slabs and 1½″ thick top concrete cast in situ.
2. Similar Semi-precast roof with 12″ bricks.
3. R.C.C. precast roof with bricks, and
4. Asbestos sloping roof for rear verandah.

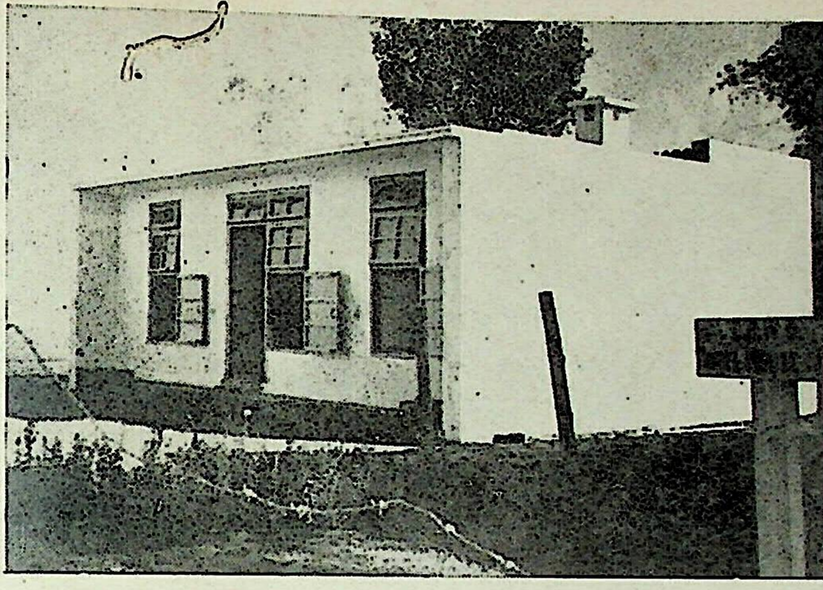
Finishing—½″ thick cement plaster in 1:6 mortar inside and outside and colour washed. Wood-work is painted.

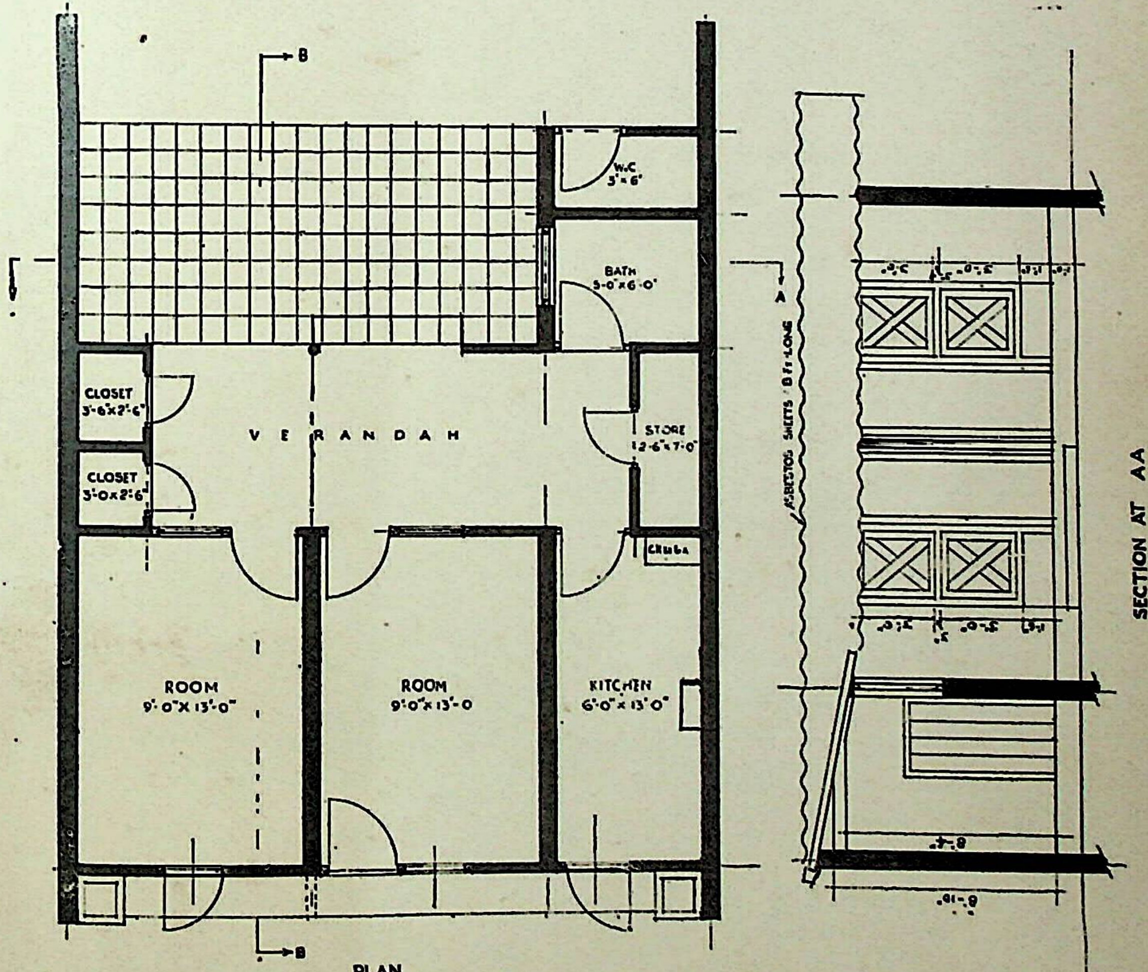
Flooring—1″ thick C.C. 1:2:4 finished smooth with neat cement over a bed of CC 1:5:10.

Services—Indian pattern WC. 3 taps and electricity.

Special Features

1. Semi-precast roof at 8′-6″ height.
2. Windows are big with low sills for through cross ventilation.
3. Low house with no foundation for non load bearing cross walls.
4. Back verandah on south-side to provide a sunny working place during winter, and give protection to the rooms during summer.





13.—CENTRAL P. W. D.-MODEL HOUSE (2)

14

A small compact house put up by the Central Public Works Department. An interesting architectural feature of this house is that the roof does not rest on the partition walls (which, incidentally, are only 4½″ thick)—the central pillar does this job. The floor height is only 8′-6″.

DATA

1. Floor area . . . . 416 s. ft.
2. Plinth area . . . . . . 512 s. ft.
3. Cost at Delhi (including the cost of services) . Rs. 4,673 At Delhi.
4. Plinth area rate . . . . . . Rs. 9/2/- sq. ft.
5. Floor area rate . . . . . . Rs. 11/4/- sq. ft.

SPECIFICATIONS

Foundation and Plinth—6″ thick c.c. 1:5:10 in foundations using Jumna sand and 1½ gauge stone ballast. Mixed class brick work in C.M. 1:6. ½″ thick C.M. 1:3 for damp proof course.

Superstructure—9″ thick mixed class brick-work in C.M. 1:6 RCC lintels. Half brick partition walls of brick in C.M. 1:4. Hoop iron reinforcement of 1″ × 1/16″ at every fourth course.

Doors and Windows—1½″ thick soft-wood panelled doors with frames. Windows 1½″ thick of soft-wood and glazed. Iron fittings and fixtures. Windows provided with 5/8″ dia. bars at 3″ c.c. Cement concrete jali 2″ thick for ventilators.

Roofing—RCC roof slabs 4½″ thick top finished with 2″ mud-phuska and 2″ thick brick tile covering and cement grouted with C.M. 1:3.

Finishing—½″ thick cement mortar 1:6 plaster and colour washed. Wood-work painted with oil paint.

Flooring—1½″ thick C.C. 1:2:4 using Badarpur sand and D.Q. stone ballast of ¾″ gauge and finished with a floating coat of neat cement. This slab is laid over a bed of 1:5:10 cement concrete.

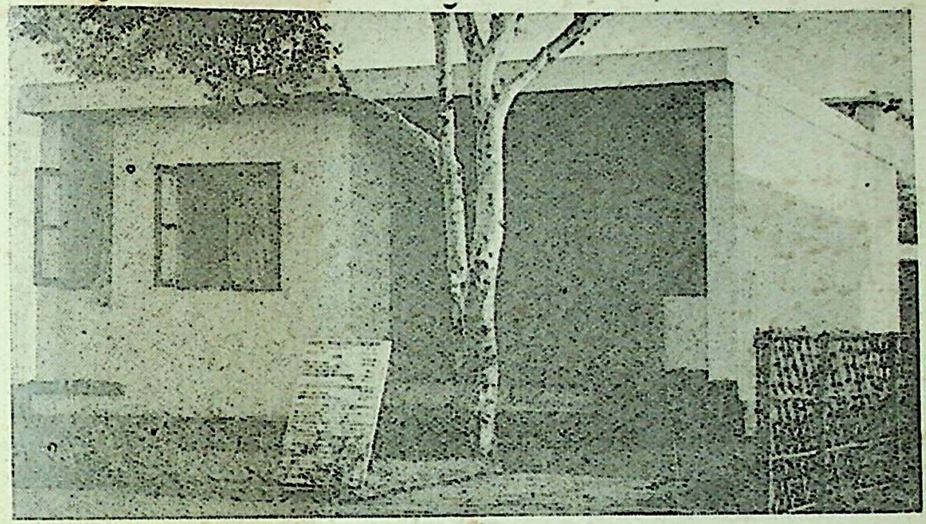
Services—White glazed earthern WC pan with flushing arrangement and connected to the external Municipal man-hole. 3 taps, 60 gallons water tank and electrification.

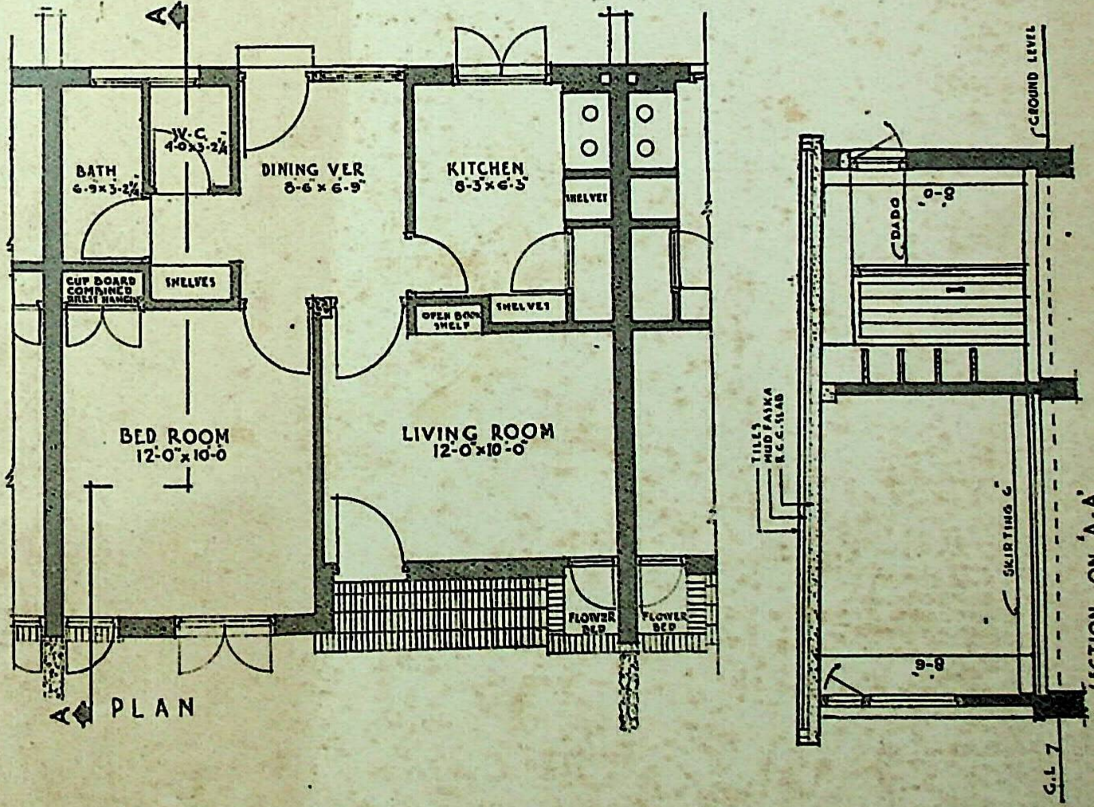
Special Features

1. Court-yard compound wall.
2. Adequate service facility.
3. Compact planning and adequate storing space.

People's Congress

Chu Teh, member of the Secretariat of the Central Committee of the Communist Party of China was elected a deputy to the National People's Congress ...





14.—CENTRAL P. W. D.—MODEL HOUSE (i).

Senior Architect C.P.W.D. New Delhi.

15

This house, put up by the Government of Uttar Pradesh, is designed on traditional lines and makes use of bricks extensively—not only as is usual for walls but also for the roof. The brick-work in the roof is reinforced. This type of two-roomed quarters have been built in sugar factory areas of Uttar Pradesh.

DATA

1. Floor area . . . . 486 s. ft.
2. Plinth area . . . . 608 „
3. Cost in Uttar Pardesh . . . . Rs. 4,400/-
   „ „ Delhi . . . . Rs. 4,900/-

	Uttar Pradesh	Delhi
4. Plinth area rate .	. 5/12/- per s. ft.	7/5/- s. ft.
5. Floor area rate	. 7/4/- „	9/2/- „

SPECIFICATIONS

Foundation and Plinth—2′-0″ deep, 1′-6″ wide, 9″ thick lime concrete with 1½″ brick ballast 1′-2″ high plinth with 2nd class bricks in C.M. 1:6.

Superstructure—2nd class 9″ thick brick work in mud, except jamps of doors and windows, 6″ layer below roofs, pillars of verandahs shall be in C.M. 1:6.

Doors and Windows—1½″ thick battened and braced doors and windows of country wood. The frame of door 4″ × 3″, windows 3″ × 3″ iron fittings.

Roofing—This is of reinforced brickwork with 1st class bricks in C.M. 1:3. On this ½″ earth and ½″ sand insulation layer and over these lime concrete terracing of 3″ thickness is laid.

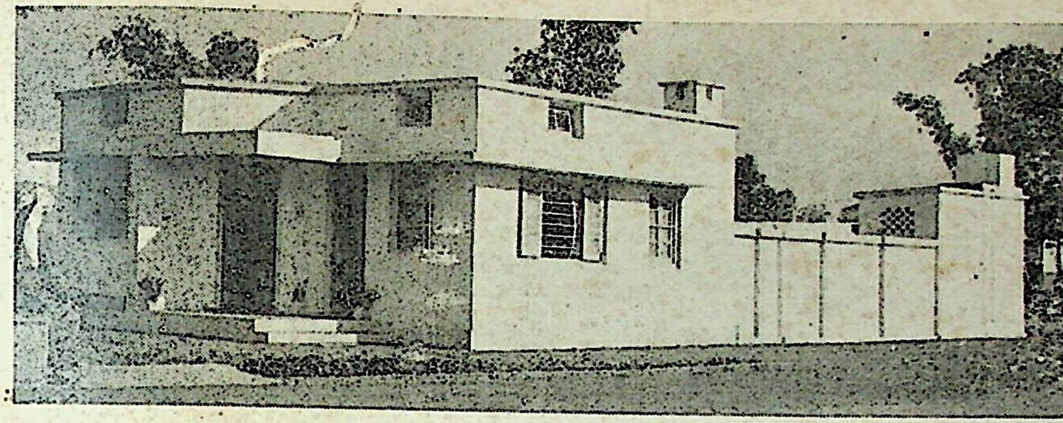
Finishing—Plaster ⅜″ thick of C.M. 1:6 and white-washed. Woodwork oil painted. External walls finished with snowcem.

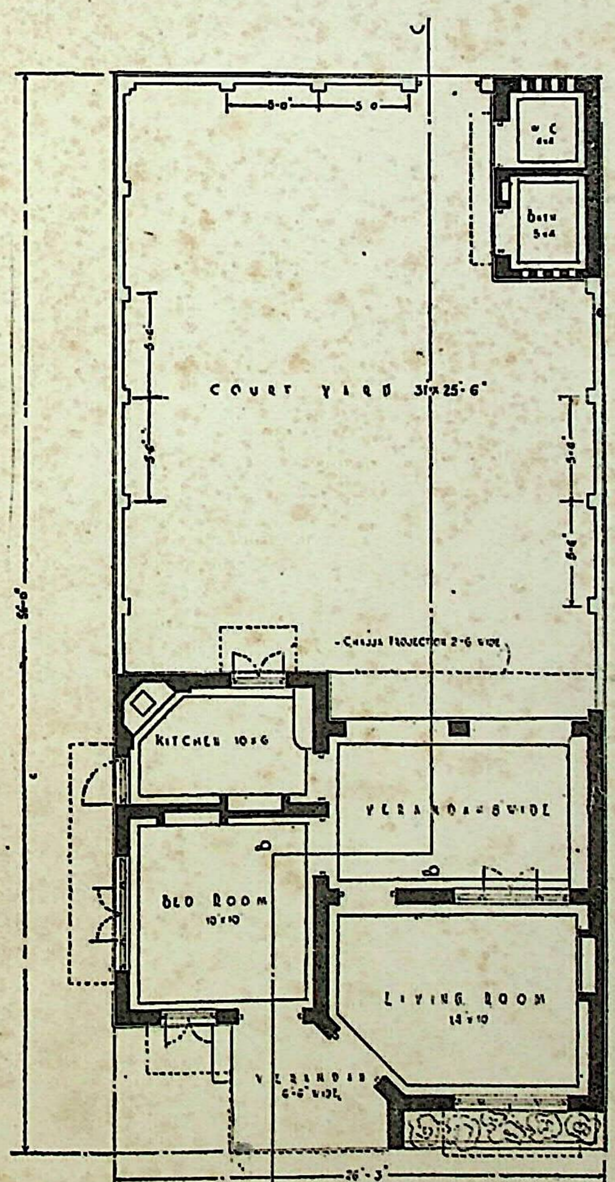
Flooring—1″ thick C.C. 1:1½:3 over 3″ lime concrete laid to proper slopes and top finished with neat cement.

Services—Flushed W.C. with Soak pit.

Special Feature

1. Reinforced brick roof.





GROUND PLAN

K. N. Misra
T. V. Planner
to U.P. Govt
Lucknow

Johari
Senior Architect
T. Planning Dept
Lucknow.

15.—GOVERNMENT OF UTTAR PRADESH.

16

The Construction Board of the Government of West Bengal have experimented this house with four different types of walls. In each room, the wall is based on a different technique but the materials used are more or less the same—T bricks, Cement and Cinder.

DATA

1. Floor area	. . . . . .	469 s. ft.	
2. Plinth area	. . . . .	500 s. ft.	
3. Cost at Calcutta	. . .	Rs. 4,843/-/-	Including the cost of services.
Cost at Delhi schedule of rate	.	Rs. 4,063/-	
		Calcutta Rs.	Delhi Rs.
4. Plinth area rate	. . . .	9/11/0 s. ft.	8/2/0 s. ft.
5. Floor area rate	. . .	10/5/0 s. ft.	8/10/8 s. ft.

[The costs given here have been supplied by the Exhibitor.]

SPECIFICATIONS

Foundation and Plinth—Cement concrete foundation 1:3:6 under columns and 5″ thick brick work in c.m. 1:6 between columns.

Superstructure—(a) Double 1½″ thick precast concrete panel with airgap for outer walls. 2″ thick single panel inner walls between RC columns. Concrete is vibrated.

(b) 3″ Panel walls 1:3:6 reinforced with ¼″ bars at 14″ centres. Columns are in 1:2:4 vibrated concrete reinforced with nos. ¼″ bars.

(c) 8″ hollow cinder cement block in CM 1:6.

(d) 4″ Special T—bricks.

Doors and Windows—1″ thick Z. pattern shutters with 3″ × 3″ doors frames and 3″ × 2″ window frames of local cheap wood.

Roofing—R. C. slab 4″ thick for rooms and 3″ for verandah, etc.

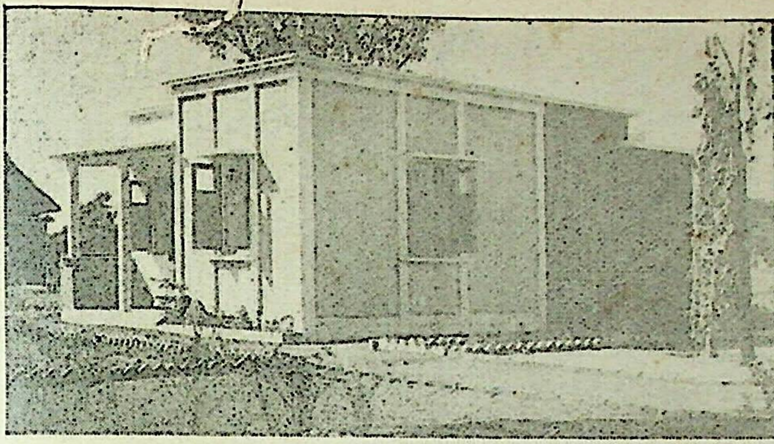
Finishing—No plastering. Only white or colour washing after properly closing any holes or irregularities with cement mortar and wash.

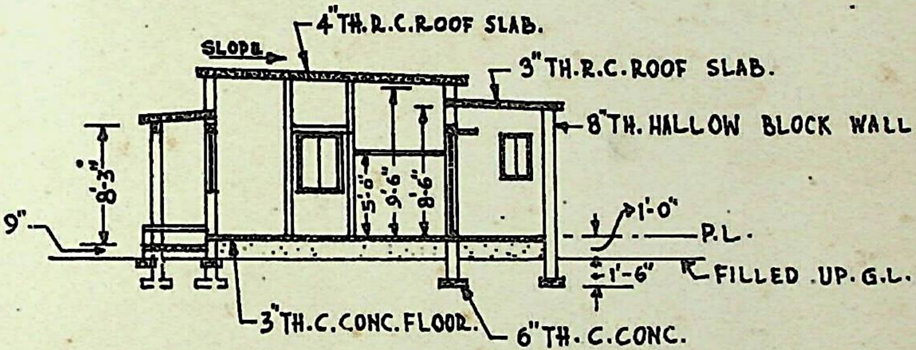
Flooring—3″ cement concrete 1:4:8 over rammed earth, finished smooth.

Services—Flushing cistern with Indian W. C. pan, taps electricity.

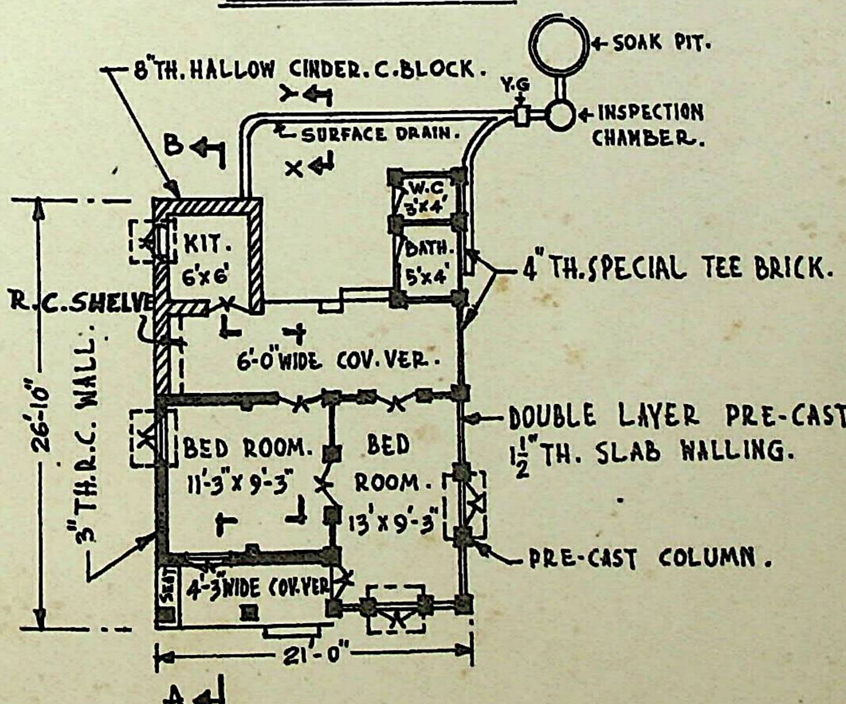
Special Features

1. Precast panels 1½″ thick with air-gap for outside walls.
2. Cast in situ 3″ thick wall lightly reinforced of ¼″ dia. 0′-6″ centre to centre properly screened to R. C. walls with ¼″ dia. bars.
3. Flooring of 1:4:8 3″ thick and finished smooth with neat cement.
4. Hollow cement cinder blocks in Superstructure.
5. Special T. bricks for breaking joints both horizontally and vertically.





•SECTION•ON•AB•



•PLAN•

16.—GOVERNMENT OF WEST BENGAL—CALCUTTA.

17-18

This small house is designed for warm and humid climates generally characteristics of the coastal areas in the tropics. Big ventilators and wide vertical louvres make it extremely airy and comfortable. The asbestos roof, pillar and panel construction with the light foundation make the structure particularly suitable for loose or soft soils.

DATA

1. Floor area	. . . .	595 s. ft.	
2. Plinth area	. . . .	670 s. ft.	
3. Cost in Bengal	. . . .	Rs. 4,240/-/-	
Cost in Delhi	. . . .	Rs. 33,38/-/-	
		Bengal	Delhi
4. Plinth area rate	. . . . .	6/5/-	4/15/- s. ft
5. Floor area rate	. . . . .	7/2/-	5/10/- „

[The costs given here have been supplied by the Exhibitor]

SPECIFICATIONS

Foundation and Plinth—2′-6″ deep 2′-6″ square foundation for piers with brick footings. Panel walls are supported on R.C.C. beams resting on the piers.

Superstructure—2nd class brick work in cement mortar.

Doors and Windows—Wooden doors windows with metal sheet louvres and ventilators of Centre heng C.I. shet flaps.

Roof—Cement asbestos sheet roofing supported over sawn wooden scantlings. Bamboo mat Ceiling in living rooms.

Finishing—Doors and windows painted, external walls colour washed, and internal walls of room plastered.

Flooring—1″ thick Art stone laid on 1″ sand over 12″ of consolidated fill.

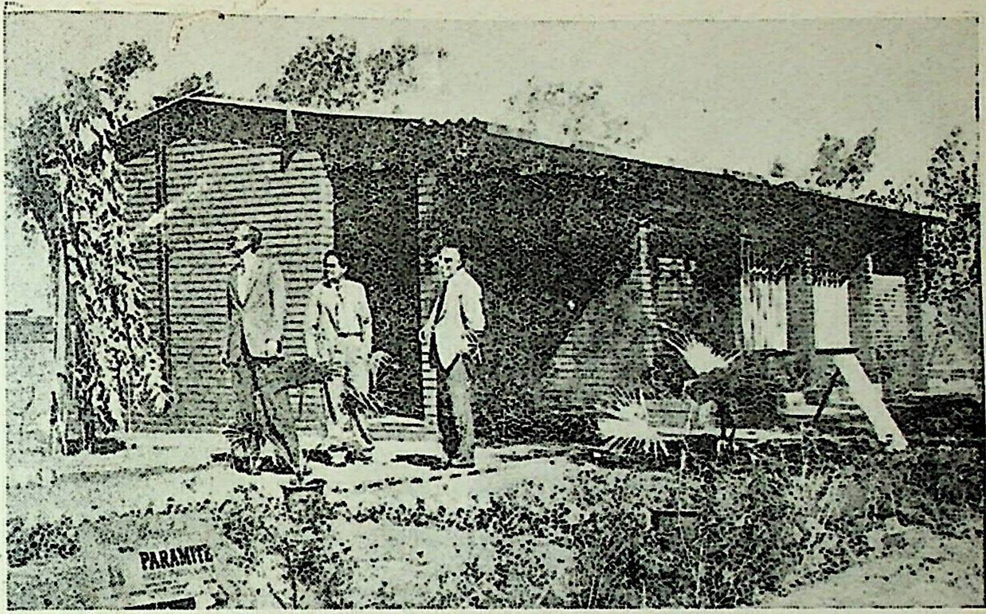
Servicing—Indian type water closet, 3 taps.

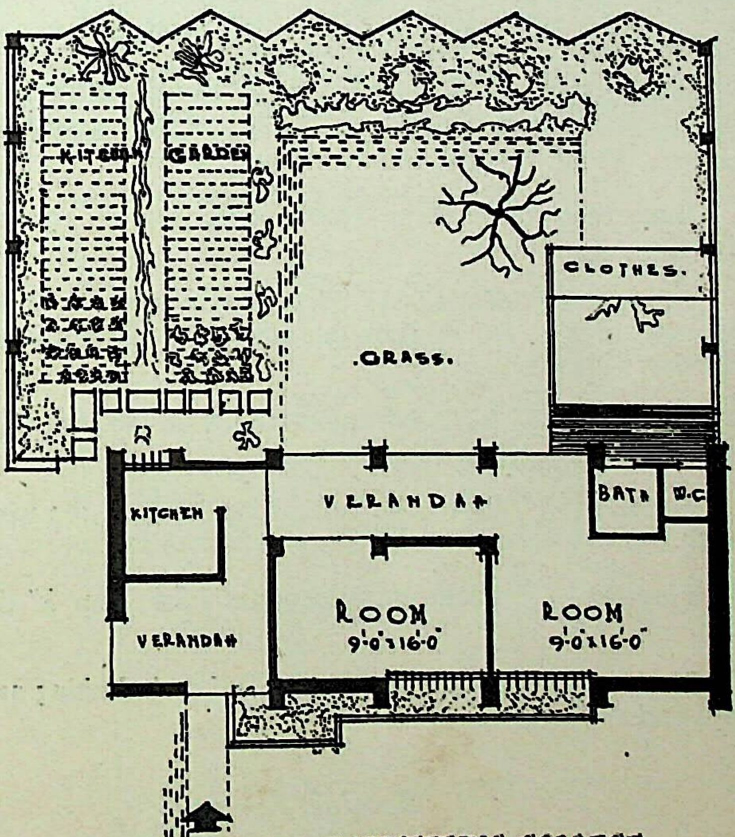
Special Features

(1) Low roof.

(2) No foundation for partition walls which rest on plinth R.C.C. beams.

(3) Windows and ventilators of wooden sheet louvres.





17-18—BENGAL ENGINEERING COLLEGE.

19

A good compact house put up by the Military Engineering Service.

DATA

1. Floor area	. . . . . .	471 sq. ft.
2. Plinth area	. . . . . .	618 sq. ft.
3. Cost at Delhi	. . . . . .	Rs. 4,978/-/- Delhi;
4. Plinth area rate	. . . . .	Rs. 8/1/0 sq. ft.
5. Floor area rate	. . . . .	Rs. 10/10/0 sq. ft.

SPECIFICATIONS

Foundation and Plinth—1′-6″ deep. 1′-3″ wide. Pcc 1:4:2. 6″ thick stone ballast. BB in C:M 1:8. ½″ thick CM 1:3 provided as damp proof course. Plinth is kept 1′-0 above ground level.

Superstructure—B.B. in cement mortar and 4½″ partition walls in c.m. 1:3.

Doors and Windows—1¼″ thick Deodar wood doors with frames of half panelled half glazed or fully panelled, with iron fittings. Fully glazed Deodar windows.

Roofing.—4½″ RCC slab roof, finished on top with lime concrete laid to slope.

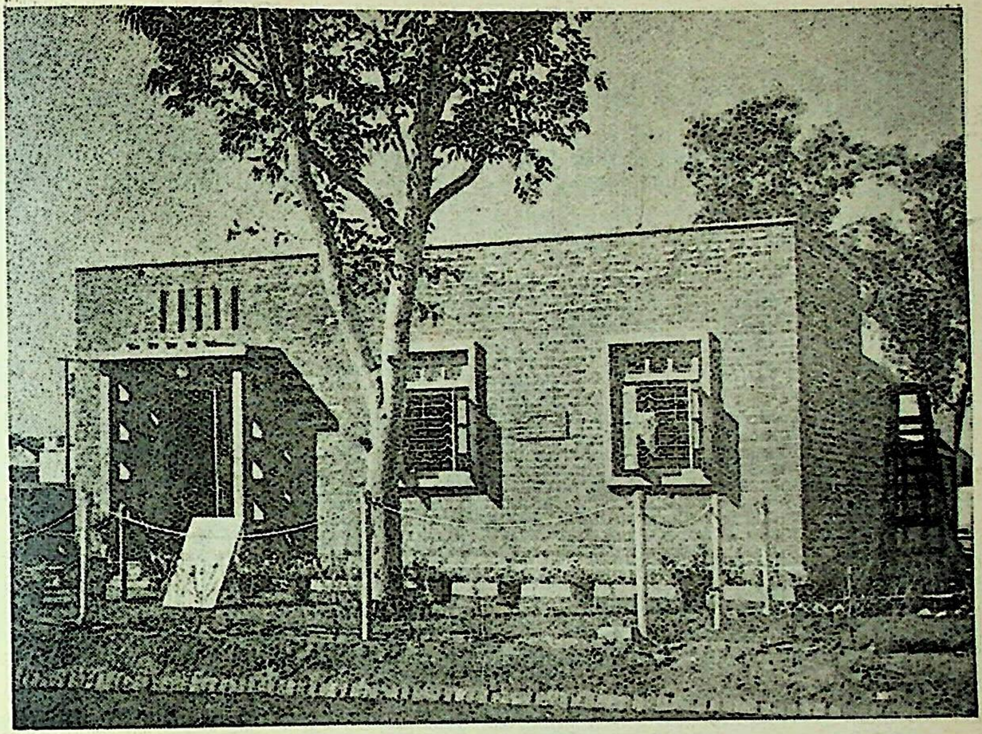
Finishing—½″ thick C.M. 1:6 and rendered on top with white or colour wash. Wood-work painted.

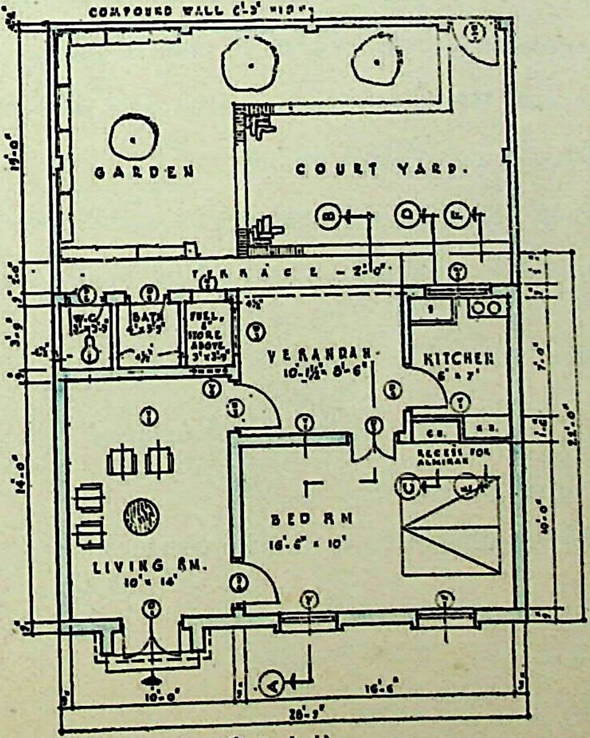
Flooring—1½″ thick cement concrete 1:2:4 over 3″ thick lime concrete bed.

Services—One Indian type glazed WC with flushing arrangement—water taps and electricity.

Special Features

1. Good storing space.
2. Jally ventilation in W. C. just below the roof slab.





• PLAN •

19.—MILITARY ENGINEERING SERVICES

20

This is another house put up by the Asbestos Cement Company Limited. The design is traditional and the material used for roofing is Asbestos Cement sheets.

DATA

1. Floor area . . . . 393 s. ft.
2. Plinth area . . . . 483 s. ft.
3. Cost at Bombay (Excluding cost of services) Rs. 3,449/-
   „ „ Delhi Rs. 3,280/-

	Bombay	Delhi
	Rs.	Rs.
4. Plinth area rate	7-2-3	6/13/-
5. Floor area rate	8-13-0	8/5/6

SPECIFICATIONS

Foundation and Plinth—Foundations according to nature of the soil. The height of plinth is 18″ above G.L. and is of brick in mud mortar.

Superstructure—9″ Brickwork in mud mortar.

Doors and Windows—Plain planked and with Asbestos Sheet Panels.

Roofing—Trafford sheet roofing.

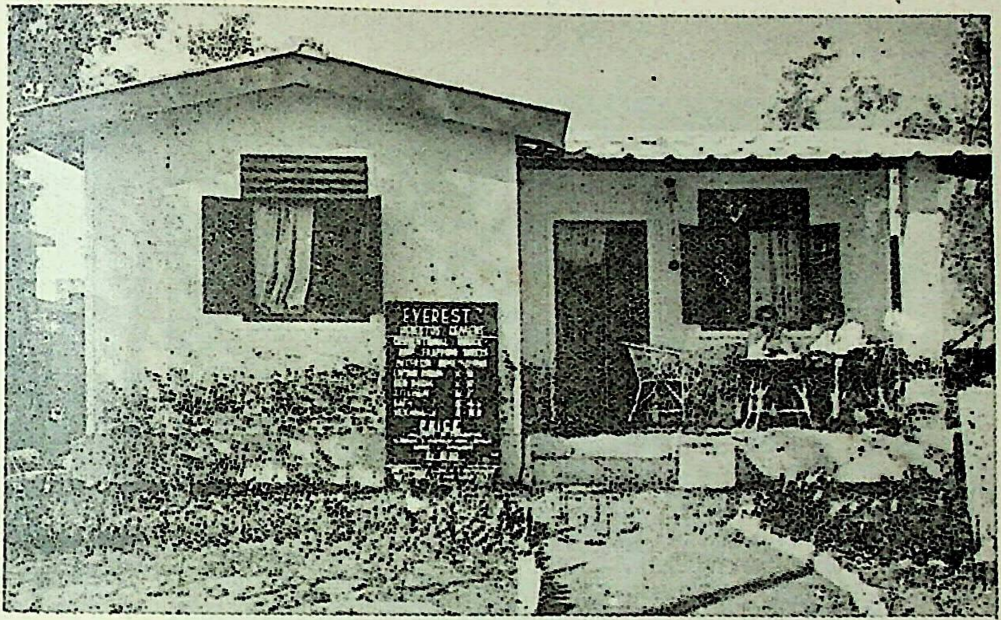
Finishing—Pointing wall and colour washing on both sides.

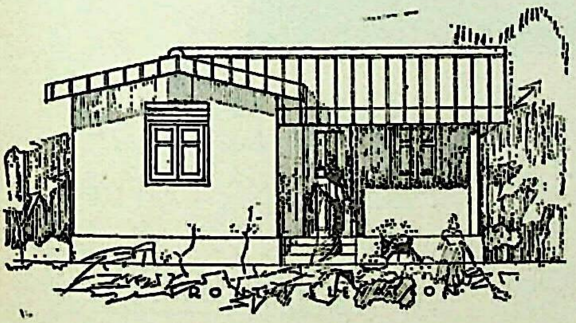
Flooring—1″ thick using C.M. 1:4 on mud. Some areas with cow-dung and clay-lipping.

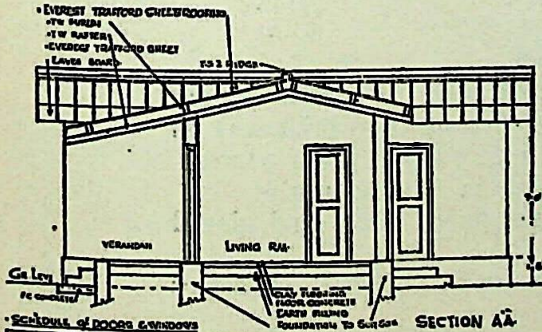
Services—Nil.

Special Features

1. Trafford sheet roof.
2. Flooring straight on earth with cement plaster.

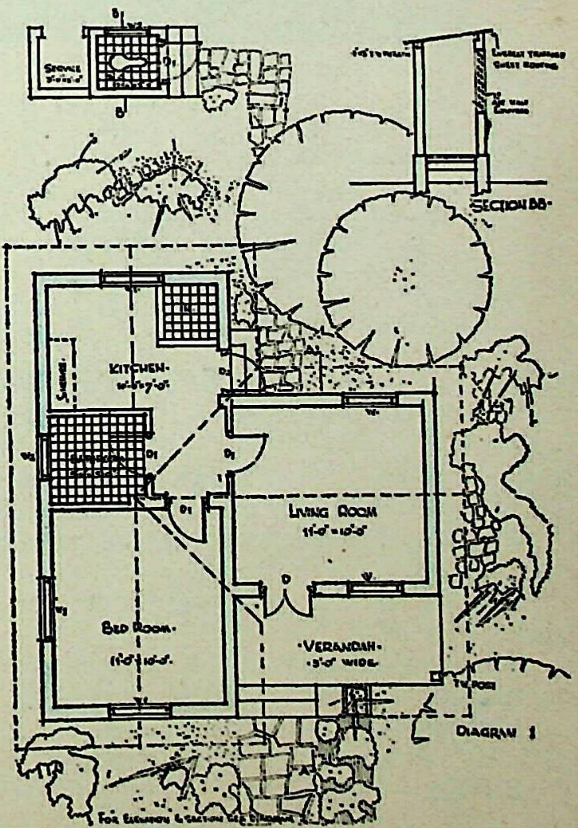






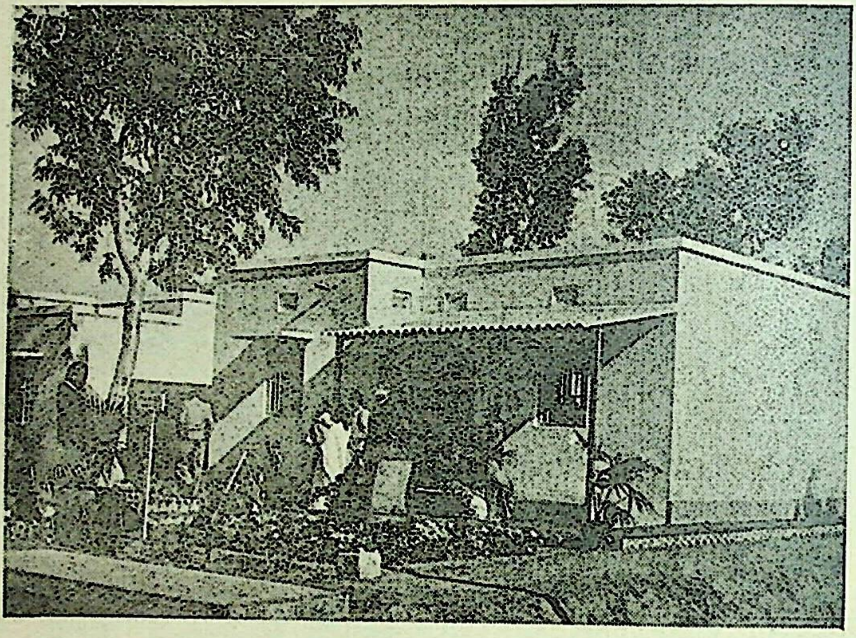
SCHEDULE OF DOORS & WINDOWS

MARK	WIDTH	HEIGHT	TYPE	NO.	REMARK
DOOR D	3'-0"	6'-6"	PLAIN - FLANKED	1	-
DOOR D1	2'-6"	6'-6"	DBL PANELS	4	-
DOOR D2	2'-6"	6'-6"	PLAIN PLANKED	1	-
WINDOW W	5'-0"	4'-6"	[illegible]	2	[illegible]
WINDOW W1	3'-6"	4'-6"	[illegible]	3	" - "
WINDOW W2	2'-6"	3'-6"	WITH A.C. LOUVRES	2	



20.—ASBESTOS CEMENT COMPANY, LTD.

21



DATA

1. Floor area . . . . 601 s. ft.
2. Plinth area . . . . 742 s. ft.
3. Cost as per railway . . . . . Rs. 4,944/-/-
   Cost as per Delhi Schedule . . . . Rs. 5,448/-
   (Including cost of services)

	Railway Rs.	Delhi Rs.
4. Plinth area rate	6/11/-	7/14/-
5. Floor area rate	8/4/-	9/-/-

SPECIFICATIONS

Foundation and Plinth—1′-6″ wide and 1′-9″ deep. 9″ thick cement concrete 1 : 5 : 10. Plinth 1′ above ground level. Second class brickwork in cement mortar 1 : 8. 1″ thick cement concrete 1 : 2 : 4 damp proof course.

Superstructure—9″ thick, 2nd class brickwork in mud mortar.

Doors and Windows—Softwood panelled and glazed doors and glazed windows.

Roofing—R.C.C. roof over rooms, verandah and kitchen. Asbestos sheets over W.C.

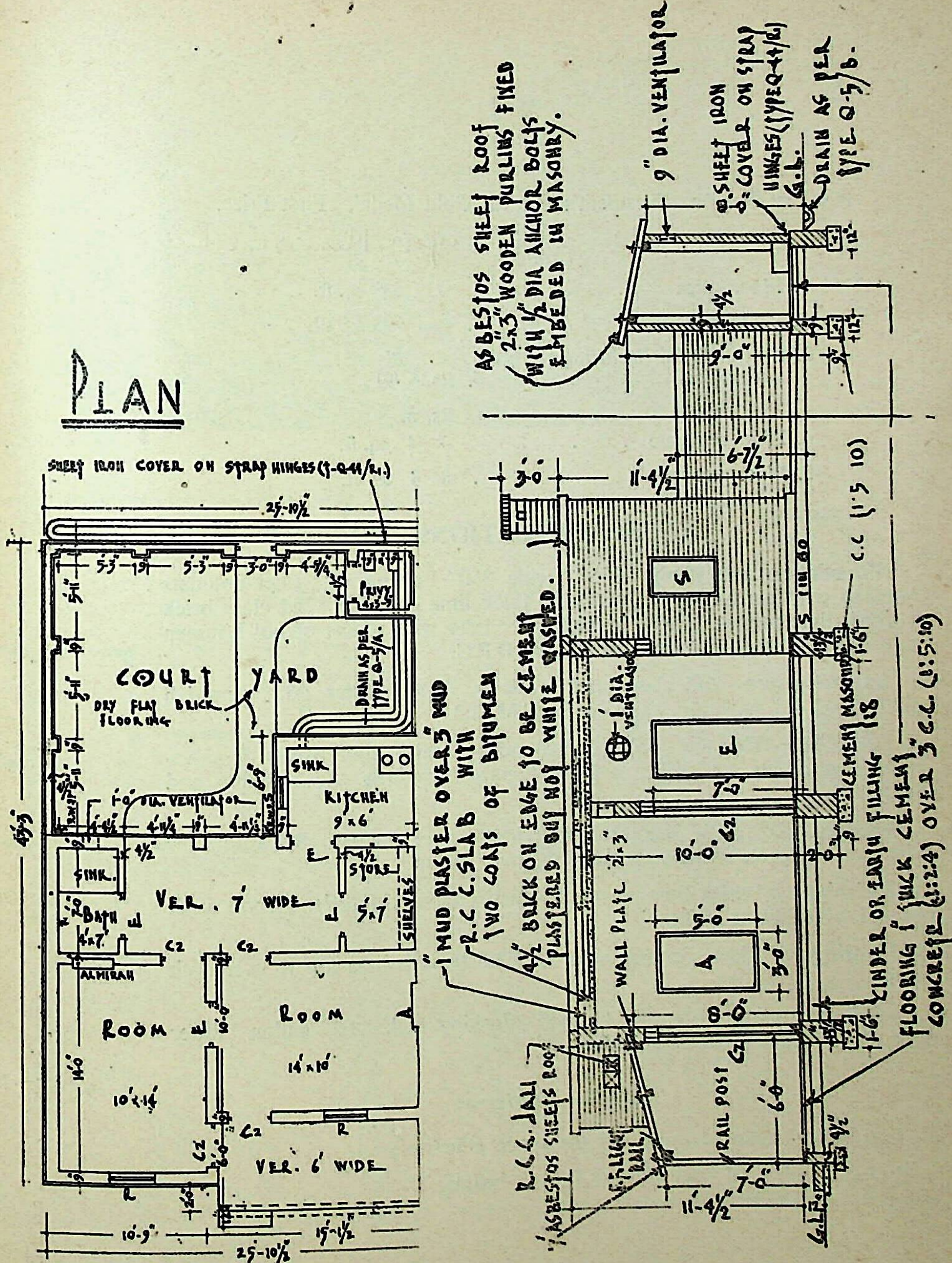
Finishing—Plaster in 1:8 cement mortar on inside and 1:3 cement mortar outside finished with white washing.

Flooring—1″ thick cement concrete 1:2:4 over 3″ cement concrete 1 : 5 : 10. Brick flooring in the courtyard.

Services—Indian type W.C. and Electrical installations.

Special Feature

Brick flooring in the courtyard.



21.—NORTHERN RAILWAY.

Prize House.

22

Hot-Dry Region—President's Award, Gold Medal, First Prize.

DATA

1. Floor area		683 sq. ft.
2. Plinth area		796 sq. sft.
3. Cost at Delhi (including the cost of services)	Rs. 5,791	
	Rs. a.	
4. Plinth area rate	7 4	sq. ft.
5. Floor area rate . . .	8 8	sq. ft.

SPECIFICATIONS

Foundation and Plinth—1′-6″ wide 3′-0″ deep. 18″ thick-boulders rammed with earth topped with 12″ thick lime concrete. 2nd class brick work in lime mortar 1:3, 1½″ thick c.c. 1:2:4 with a coat of hot bitumen painting and sand sprinkled over it for D.P.C.

Superstructure—2nd class brick work in lime mortar 1:3, verandah pillars and 4½″ partition walls are in C.M. 1:3.

Doors and Windows—RCC frame and 1¼″ thick door panels of galvanised iron sheets. 1″ thick teak-wood glazed windows. Iron fittings and fixtures.

Roofing—4½″ thick jack arch supported over precast R.C.C. beams with lime concrete in haunches and 3″ over crown.

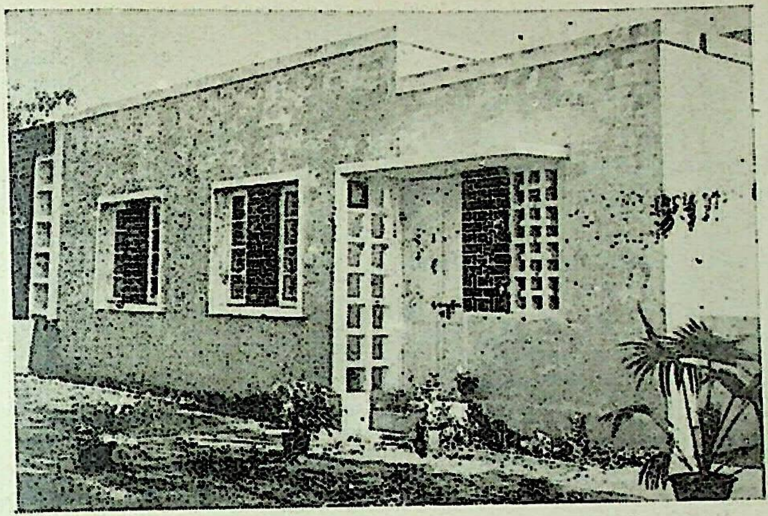
Finishing—½″ thick lime plaster 1:3 for inside and outside. Wood work painted with silicate paint.

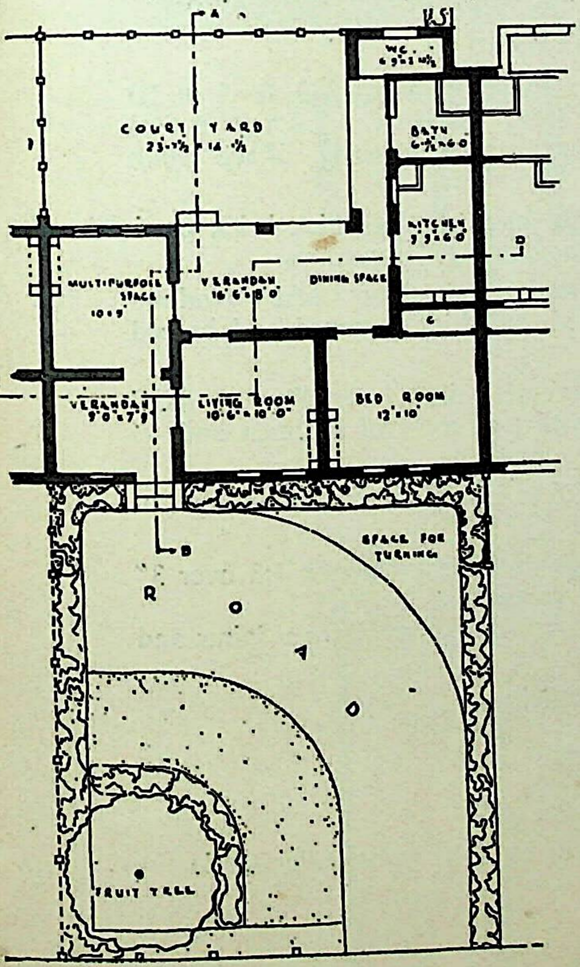
Flooring—3″ thick cement concrete 1:3:6 trovelled on top to a smooth finish.

Services—Indian pattern W.C. with flushing tank. 60 gallon water tank; 3 taps and 8 electrical points.

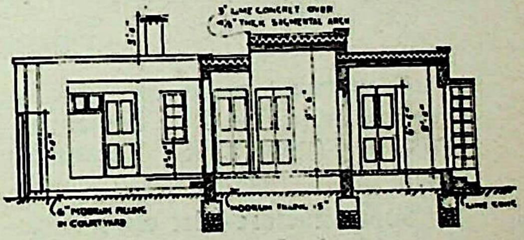
Special Features

1. Compact plan to utilise all the space effectively.
2. Jack arch roof over precast R.C.C. beams.

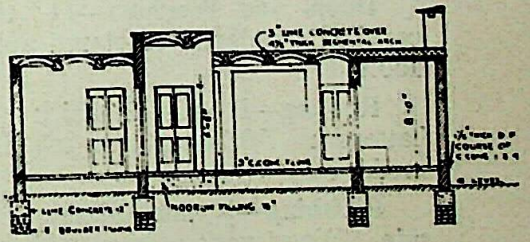




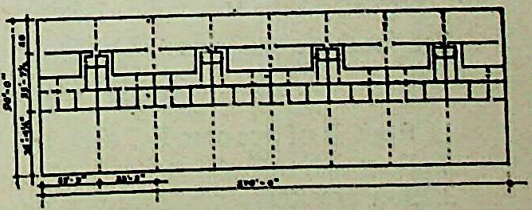
PLAN



SECTION ON 'AB'



SECTION ON 'CD'



KEY PLAN



22.—HOT AND DRY COMPETITION HOUSE.
(Shri S. P. Caprihan—Nagpur)

23

Chandigarh—*Le Corbusier*—these are the magic names that you should associate with this house. Designed by the Chandigarh Team of Architects for humble folk to live in, this house uses quite ordinary materials. The brick wall has sun breakers which make the interior cool. The roof is precast.

DATA

1. Floor area	. . . .	433 sq. ft.	
2. Plinth area	. . . .	561 sq. ft.	
3. (*a*) Cost at Punjab	. . . . .	Rs. 3,980/-/-	
(*b*) Cost at Delhi	. . . . .	Rs. 3,996/-/-	
		Chandigarh	Delhi
4. Plinth area rate	. . . . .	Rs. 7/2/-	Rs.7/2/-
5. Floor area rate	. . . . .	,, 9/3/-	,, 9/3/-

SPECIFICATIONS

Foundation and Plinth—C.C. 1:8:16. Plinth 9″ above G. level in 1st class brick in CM 1:7. Horizontal DPC of $1\frac{1}{2}''$ thick CC 1:2:4 and vertical DPC of $\frac{3}{4}''$ thick CM 1:3 covered with hot bitumen to inside of the plinth wall.

Superstructure—1st class bricks in mud mortar. $4\frac{1}{2}''$ thick brick partition walls in CM 1:4. Brick flat arches for lintels over openings.

Doors and Windows—$1\frac{1}{2}''$ thick *Deodar* wood doors and windows panelled or glazed or glazed and panelled $2\frac{3}{4}''$ thick battened and braced doors.

Roofing—Pre-cast 2″ thick cement concrete tiles over $7'' \times 3\frac{1}{4}''$ RCC battens at 2′-0″ apart and top finished with two coats of bitumen and 4″ mud.

Finishing—$\frac{1}{2}''$ thick plaster with CM 1:6 to inside and lime pointing outside. Wood-work painted with oil paint.

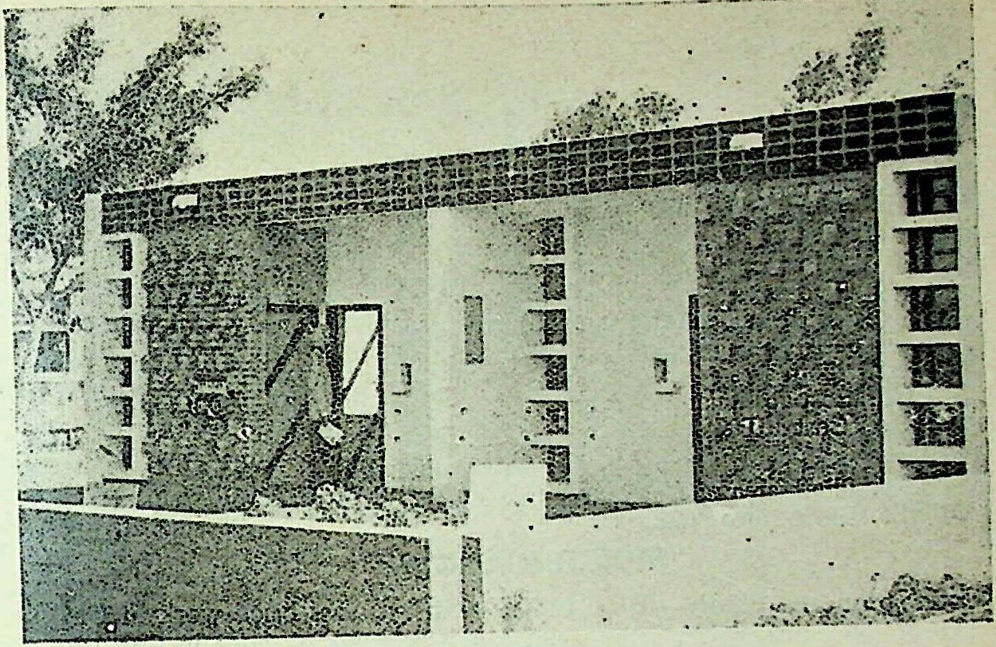
Flooring—Flat brick flooring grouted with cement mortar 1:3 over 3″ lime concrete and 4″ sand in rooms and verandahs.

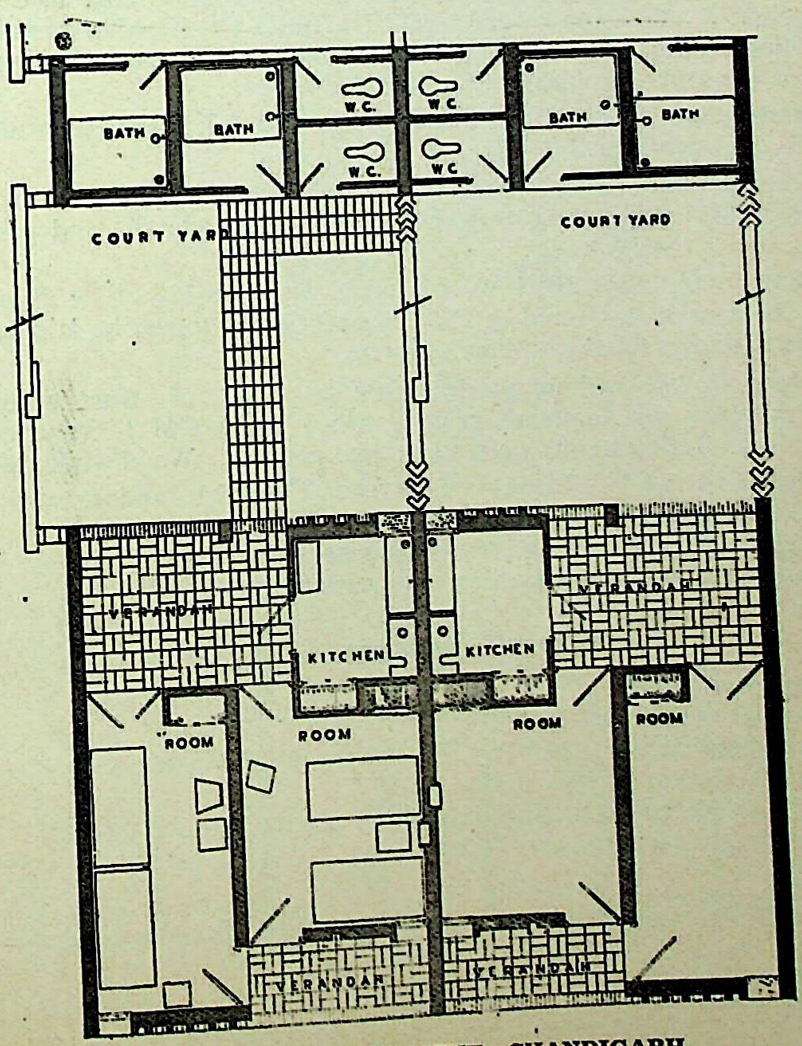
1″ thick CC 1:2:4 flooring over dry flat bricks having 1″ open joints and laid over 4″ sand bed.

Services—A water tap, W. C. and electricity.

Special Features

1. Roof is of pre-cast RC tiles and beams.
2. Foundation for flooring is of brick and sand.
3. Sun breakers on wall facing the sun to keep the walls under shade.
4. Vertical damp proof course.
5. Deep set windows.





23.—PUNJAB GOVERNMENT—CHANDIGARH.

24

Another Chandigarh house—observe the roof—no steel, no timber.

DATA

1. Floor area . . . . 218 sq. ft.
(24 sq. ft. added for community type of lavatory on proportionate cost basis).
2. Plinth area . . . . 276 sq. ft.
3. Cost at Punjab . . . . . Rs. 2,190/-/-
Cost at Delhi . . . . . Rs. 2,190/-/-

	Punjab	Delhi
4. Plinth area rate . . .	Rs. 8/-/-	Rs. 8/-/- sq. ft.
5. Floor area rate	„ 10/-/-	„ 10/-/- sq. ft.

SPECIFICATIONS

Foundation and Plinth—The C.C. 1:8:16 in 1st class brick work in CM 1:7 except the top course of plinth which will be brick on edge in CM 1:6. Plinth height 9″ above the ground level. 1½″ thick CC 1:2:4 horizontal DPC of ¾″ thick plaster and a coat of bitumen on top. Inside wall a vertical D.P.C. of the same specifications is provided.

Superstructure—First class brick work in CM 1:7. Partition walls the 4½″ thick brick work in CM 1:3.

Doors and Windows—2¼″ thick Kail-wood battened and braced doors with iron fittings. 1½″ thick, glazed or panelled or glazed and panelled windows.

Roofing—Vaulting in Brick work covered with tiles 12″ × 6″ × 2″ on top. 3″ thick brick arch to be laid in CM 1:4 and tiles at top to be laid in CM 1:6. The haunches filled with lime concrete.

Finishing—White-washing inside. Exterior face of front walls and inside of kitchen *cum* verandah, plaster with ½″ thick CM 1 : 6 and colour washed. Rest of the exterior walls to be lime pointed. Wood work painted.

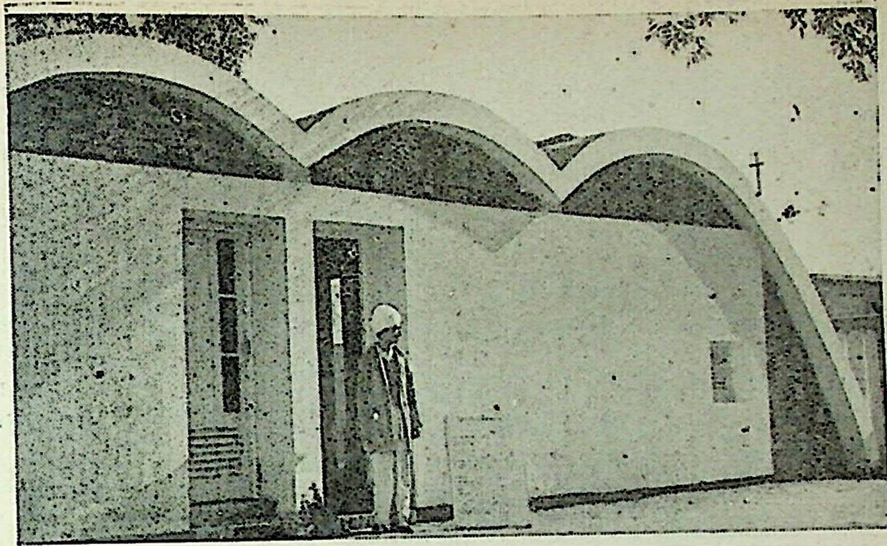
Flooring—12″ × 6″ × 2″ brick tiles over CC 1:8:16 and grouted with CM 1:3, laid over a bed 4″ thick sand.

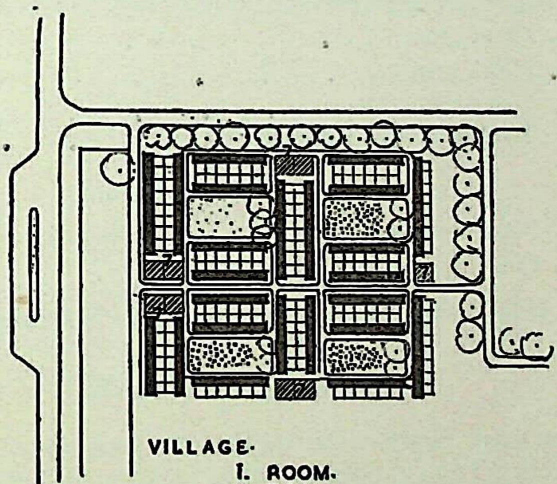
1″ thick C.C. 1:2:4 over flat bricks on a bed of 4″ thick sand.

Services—Water tap for kitchen and washing place.

Special Features

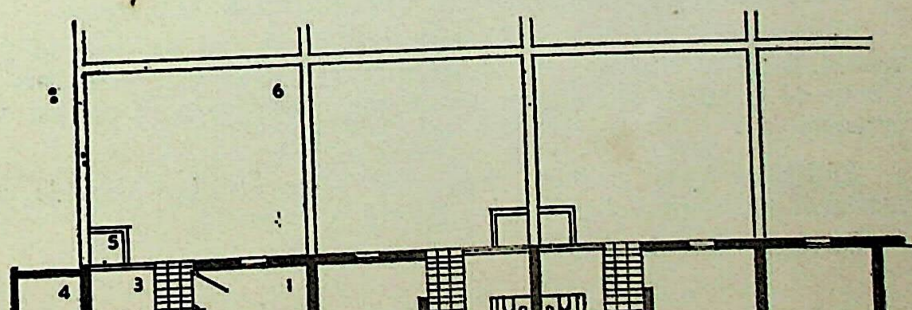
1. Brick Arch roof.
2. Deep set windows.
4. Brick flooring.
5. Vertical Damp Proof Course.
6. Walls inside coloured washed without plaster.
7. Community lavatory and bath.





VILLAGE.

1. ROOM.
2. ROOM.
3. KITCHEN VER.
4. STORE IN END HOUSE.
5. WASHING.
6. COURT YARD.
7. LAVATORY BLOCK



PLAN

24.—PUNJAB GOVERNMENT—CHANDIGARH.

25

A good well-arranged design suitable even for some urban areas. It is built of stone—an important building material found in many parts of India. The utilisation of stone makes the house particularly well protected from being affected by moisture and dampness. If you live in a damp area, you can go in for this type of house—if, of course, you can find the stone locally.

DATA

1. Floor area		482 s. ft.
2. Plinth area		676 „
3. Cost at Saurashtra		Rs. 3,529/-
Cost at present Delhi Rate		Rs. 4,810/-
	Saurashtra	Delhi
4. Plinth area rate	5/3/6 per s. ft.	7/2/- s. ft.
5. Floor area rate	7/5/- „	10/- „

[The costs given here have been supplied by the Exhibitor]

SPECIFICATIONS

Foundation and Plinth—The depth of foundation 3′-0″ and plinth 2′-0″ above G.L. The foundation filling is done with rubble stone in mud. The plinth masonry is in rubble stone in lime 18″ thick.

Superstructure—Rubble stone masonry in mud and white stone masonry in partition walls—white stone lintels and sills.

Roof Work—Precast slab of C.C. over precast R.C.C. beams.

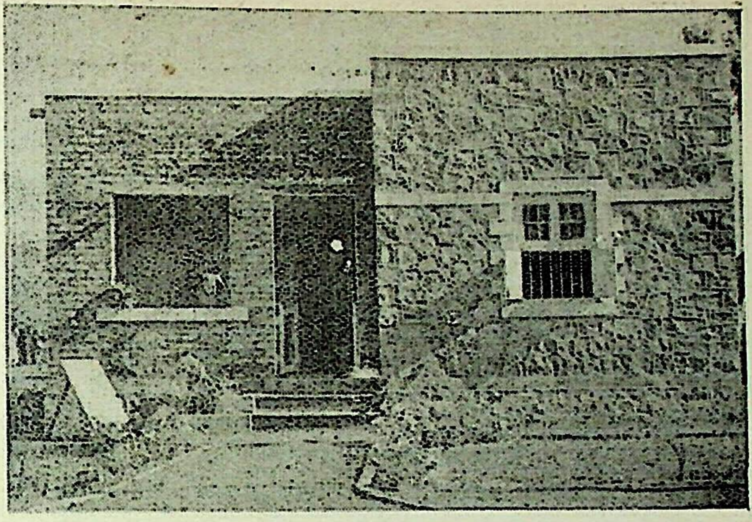
Doors and Windows—Jodka teakwood doors and windows of 3″ × 3″ frame, Panelled shutters. Windows with 1¼″ styles and M.S. bars at 4″ Centre to Centre. The fittings are of iron. Ventilators of precast cement concrete jali.

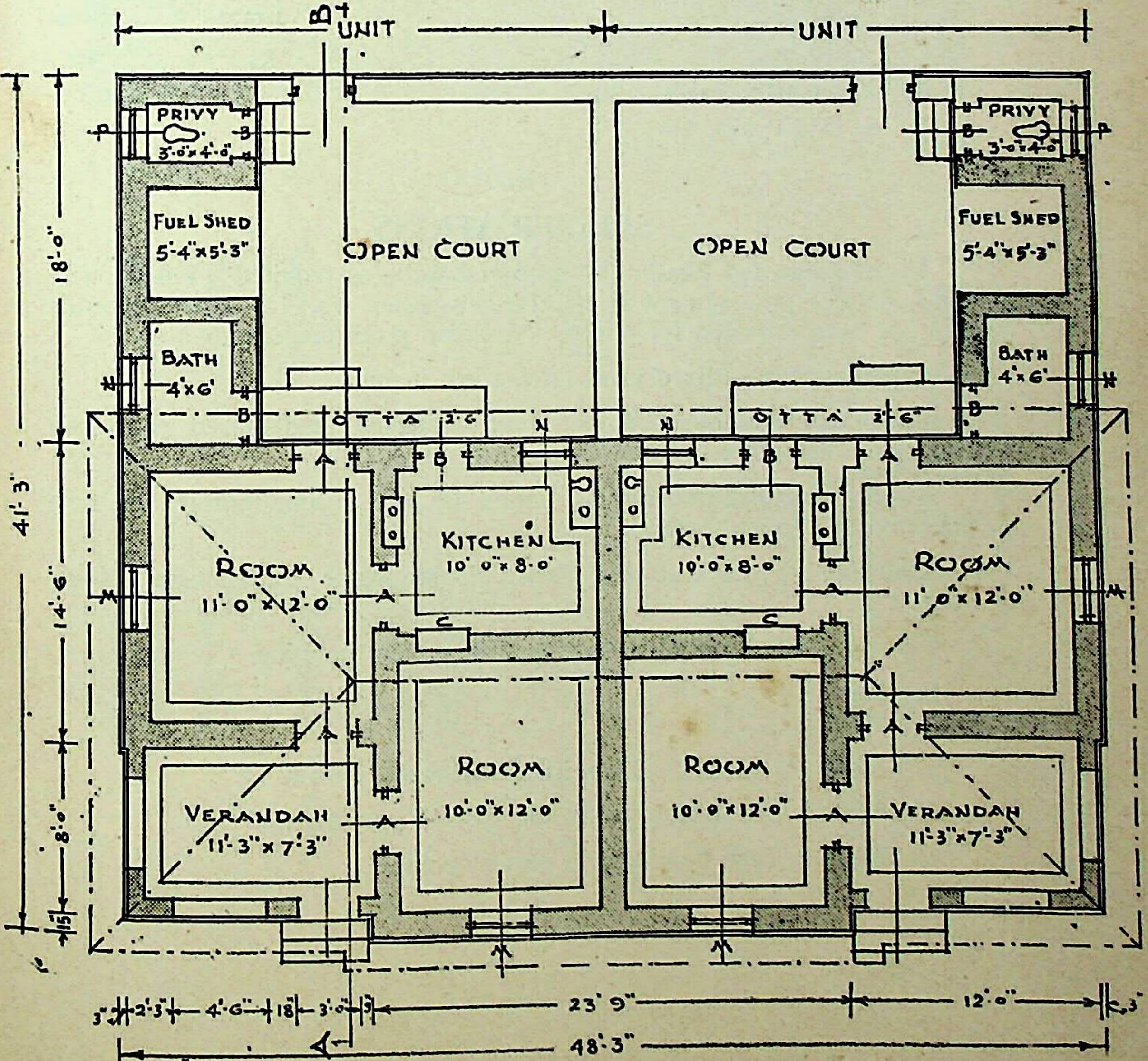
Finishing—Lime pointing inside and white washed—outside cement mortar, finished smooth. The wood work is painted.

Services—One dry latrine.

Special Features

1. Thick superstructure walls of stone—15″ thick.
2. Dry system lavatory—one.





25.—GOVERNMENT OF SAURASHTRA.

26

This house is put up by the Hyderabad City Improvement Board. It has traditional specifications, but the roof is of an experimental type. It makes use of "Goona" tiles which make it light and capable of giving better insulation.

DATA

		Hyderabad	Delhi
1.	Floor area	310 s. ft.	
2.	Plinth area	450 „	
3.	Cost as per Improvement Board (Excluding the cost of services) . .	2,800/-	
4.	Cost as per Delhi Schedule . . .	3,134/-	
		Rs.	Rs.
5.	Plinth area rate	6/4/-	6/15/-
6.	Floor area rate	9/1/-	10/2/

SPECIFICATIONS

Foundations and Plinth—$1\frac{1}{2}'$ deep and width as required. Filled with lime concrete upto ground level. 1st class brick work in cement mortars 1:8 has been provided for plinth. No damp proof course provided.

Superstructure—Mixed class brick work in mud.

Doors and Windows—Jungle wood battened and braced doors and windows with frame.

Roofing—Arched and sloping Goona tile roof in lime mortar, and lime plastered on top and bottom.

Finishing—$\frac{1}{2}''$ thick cement plaster 1:6 for inside and outside colour-washed.

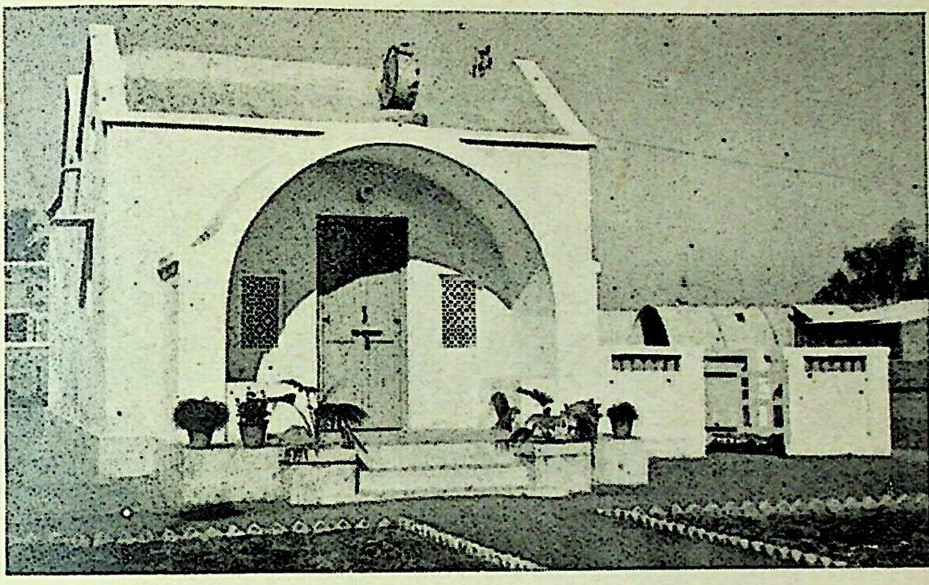
Flooring—Brick on edge flooring with cement pointing.

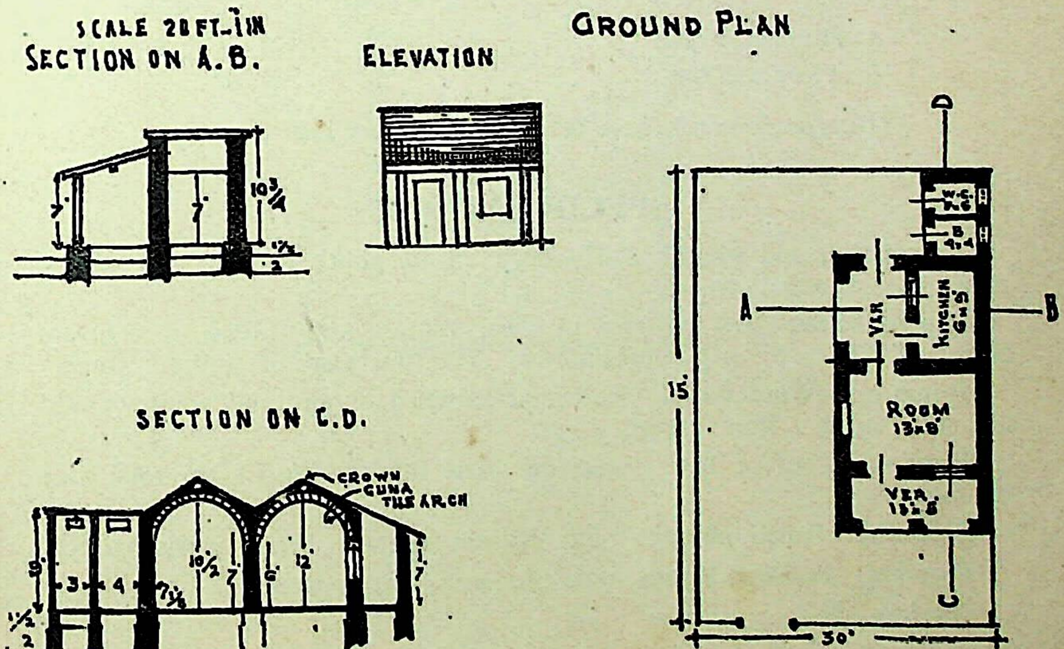
Services—Nil.

Special Features

(1) Arched and sloping goona tile roof in lime mortar.

(2) Brick on edge flooring and cement pointed.





26.—HYDERABAD CITY IMPROVEMENT BOARD.

27

Do not, if you are living in a gypsum mining area, neglect that greyish white looking material which is low grade gypsum! It can come in very useful for a house, a model of which on the following design and specifications has been put up by Bikaner Gypsums Limited. The non-traditional material,—gypsum is at present used only to a very limited extent in India for building purposes; if carefully handled and processed, it can become one of the important building materials.

DATA

1. Floor area	. . . . . .	378 s. ft.
2. Plinth area	. . . . . .	465 s. ft.
3. Cost at Bikaner " " Delhi	Excluding services	Rs. 2,770/- Bikaner
4. Plinth area rate	. . . . .	Rs. 5/15/- per s. ft.
5. Floor area rate	. . . . .	" 7/5/- " "

[The costs given here have been supplied by the Exhibitors.]

SPECIFICATIONS

Foundation and Plinth—2′-6″ deep. 1′-0 plinth above G.L. Lime concrete in foundations.

Superstructure—All masonry in superstructure and plinth of Gypsum blocks 8″ × 16″ × 8″ in gypsum mortar. The lintels are of Jodhpur stone.

Doors and Windows—1″ Kailwood battened doors and windows and salwood frames. Iron fittings.

Roofing—Roof of A.C. sheets on angle iron purlins. No roof over the lavatory.

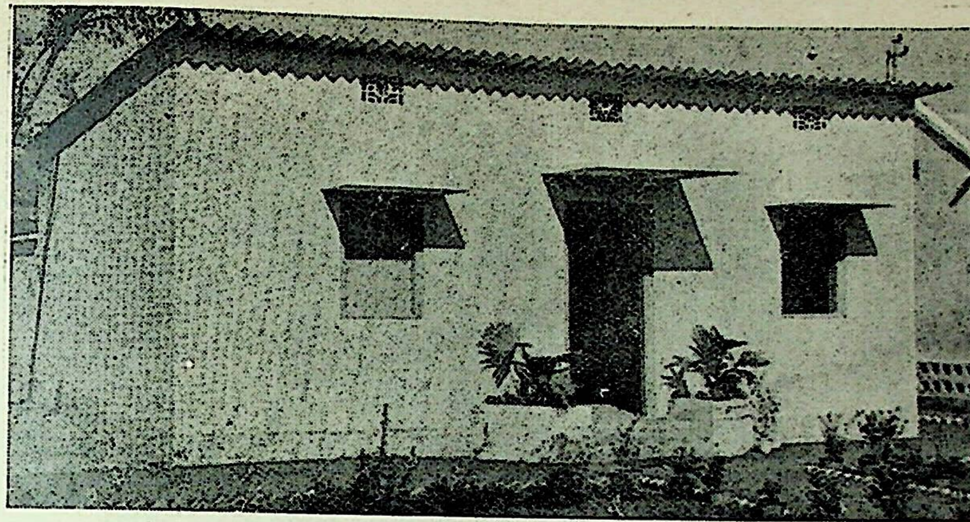
Finishing—Ruled pointing with gypsum mortar. Wood work painted

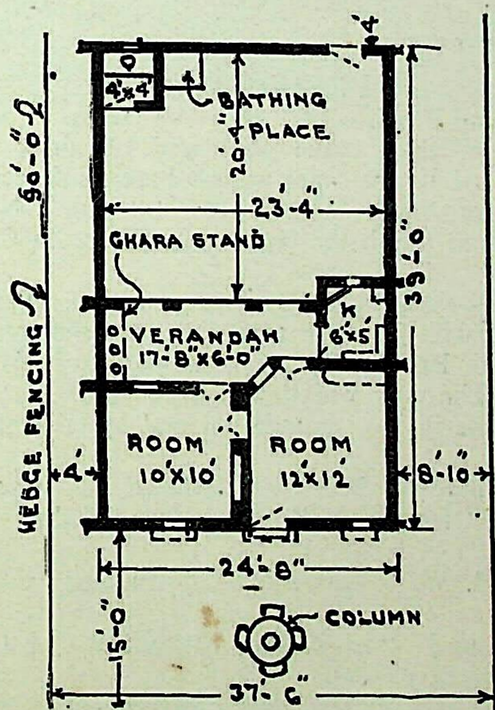
Flooring—Polished Kotah stone tiles over lime concrete.

Services—Nil.

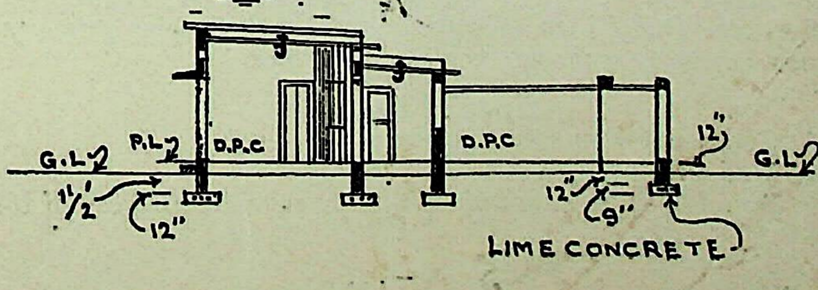
Special Features

1. No damp-proof course.
2. Sloping roof of asbestos sheets on angle iron purlins.
3. Superstructure of Gypsum Blocks finished with gypsum mortar pointing.





PLAN



CROSS SECTION

27.—BIKANER GYPSUM.

28

Do you live in a black cotton area? If you want to build a house there, you have reason to worry—your foundations have to be particularly strong and costly on that account. This house, a special feature of which is a light re-inforced brick-work frame—rather technical—but true, which makes heavy foundations unnecessary. The house acts like a box and does not crack even if the soil does. Though a box, you can breath in it.

DATA

		Gwalior	Delhi
1. Floor area	. . . .	537 sq. ft.	
2. Plinth area	. . . .	671 sq. ft.	
3. Cost at Gwalior	. . . . .	Rs. 4,763/-/-	
Cost at Delhi	. . . . .	Rs. 5,294/-/-	
4. Plinth area rates	. . .	Rs. 7/2/-	Rs. 7/14/-
5. Floor area rates	. . .	„ 8/14/-	„ 9/14/-

SPECIFICATIONS

Foundations and Plinth—2′-0″ deep 1′-9″ wide. Foundation concrete is in lime concrete 6″ thick under walls and 12″ thick under pillars, using stone aggregate. Along the outer walls a base reinforced brick beam of the size 14″ × 10″ is provided in B.B. C.M. 1:8 with 2 Nos. 3/8″ bars as re-inforcement. Up to plinth the brickwork will be in C.M. 1:8. No damp proof course.

Superstructure—Pillar and Panel construction. Panels are of B.B. in C.M. 1:12 mixed with 25 per cent. lime of cement. The columns are 14″ × 14″ size with BB in C.M. 1:8, the core of 4½″ × 4½″ will be filled with CC 1:2:4. The core will have 2 nos. 3/8″ dia. bars which will be secured to the base in the foundation and to the gable balli purlins at top.

Doors and Windows—Soft-wood battened and braced door with iron fittings and 3″ × 3″ frames. Glazed windows 1″ thick with 3″ × 3″ frames of soft-wood.

Roofing—24 B. W. G. galvanised corrugated iron sheets over balli purlins.

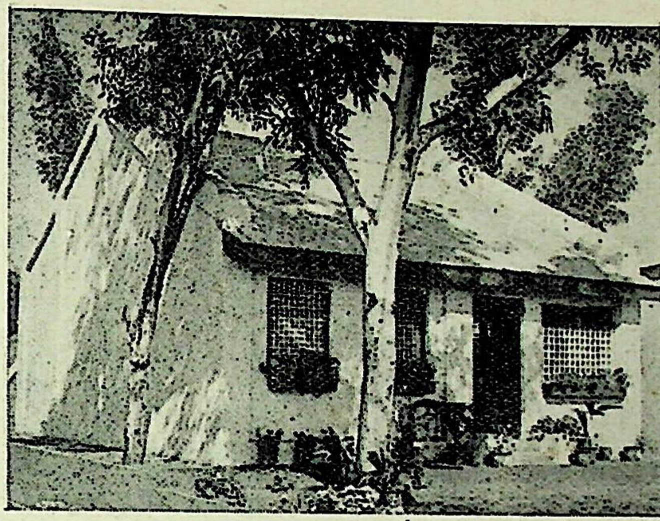
Finishing—½″ to ¾″ thick cement plaster of CM 1:6, white or colour washed. Wood work painted.

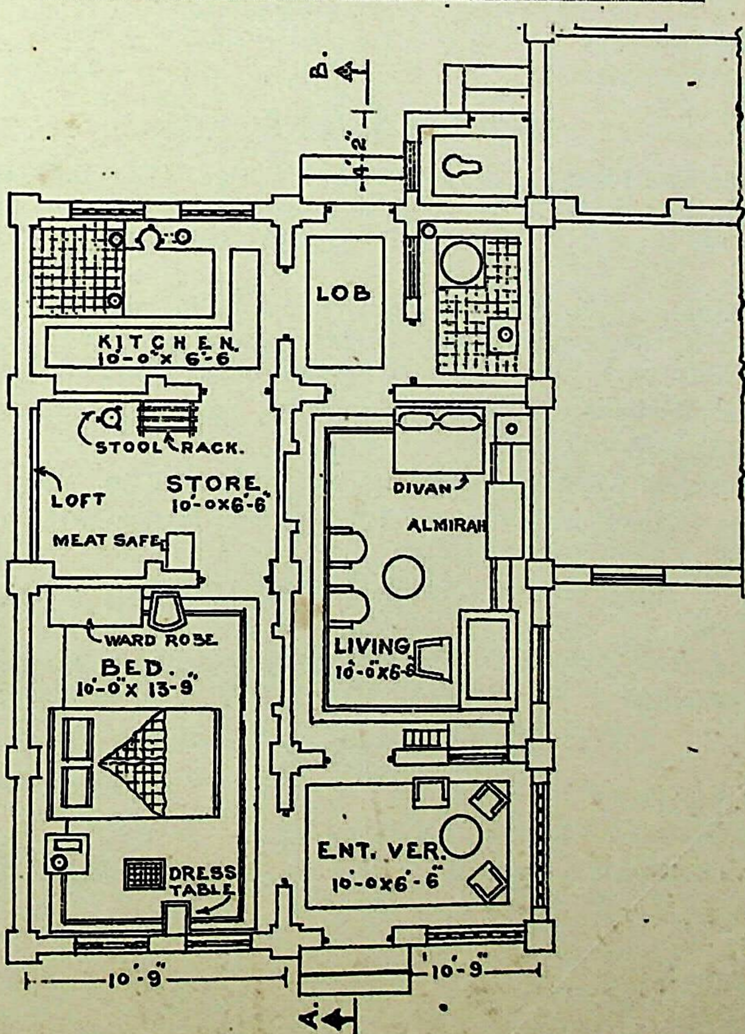
Flooring—Well consolidated earth leaped with 3 courses of cow-dung for living rooms and kitchen. For verandah WC and baths pucca flooring of 1½″ thick C.C. 1:2:4 on a bed of 3″ lime concrete (1:3:6).

Services—One ½″ tap in bath, one/WC with flushing arrangement with connections up to manhole. 5 electrical points.

Special Features

1. Corrugated iron sheet roof over balli.
2. Mud flooring with cow-dung leaping.
3. Semi-framed structure of R.B. to be suitable for areas of blackcotton soil.





28.—GOVERNMENT OF MADHYA BHARAT—SANITARY ENGINEER.

29

The house has been put up by the Northern Railway, and its special feature is that it is earth-quake proof. The structure is extremely light and the lightness is a result of the use of a wooden frame work, with thin walls and light sloping roof.

DATA

	Railway	Delhi
1. Floor area	224 s. ft.	
2. Plinth area	320 s. ft.	
3. Cost as per railway estimate	Rs. 2,800/-	
„ „ „ Delhi schedule	Rs. 3,011/-	
	Rs.	Rs.
4. Plinth area rate	8/12/-	9/7/-
5. Floor area rate	12/8/-	13/7/-

SPECIFICATIONS

Foundation and Plinth—2′-3″ wide and 1′-3″ deep. 1′-3″ thick cement concrete 1:5:10. Plinth 9″ above ground level, 13½″ wide and in 2nd class brickwork in cement mortar 1:6. Damp proof course 1″ thick in C.C. 1:2:4.

Superstructure—13½″ thick, 2nd class brickwork in mud mortar upto a height of 2′-6″ above plinth level. There are wooden posts 4″ × 4″. Panels to be filled by 4½″ thick walls in 3rd class bricks in mud mortar.

Doors and Windows—1½″ softwood panelled and glazed doors and glazed windows with iron fittings.

Roofing—Asbestos sheets roofing over king post roof truss.

Finishing—½″ thick cement plaster 1:8 in cement mortar in the interior and 1:3 cement mortar in exterior work.

Flooring—1″ thick cement concrete flooring 1:2:4 over 3″ cement concrete 1:5:10.

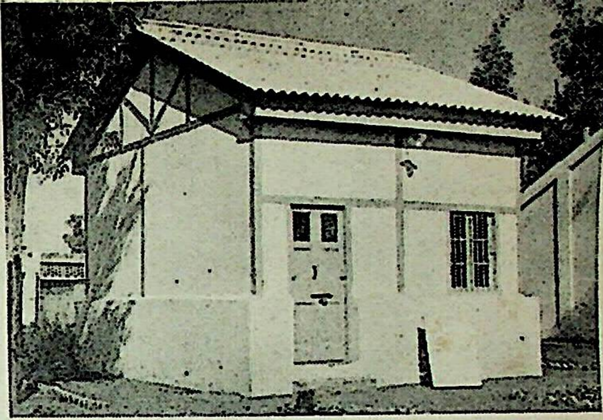
Services—Latrine pans and seats (Indian type) with sewage arrangement and electricity.

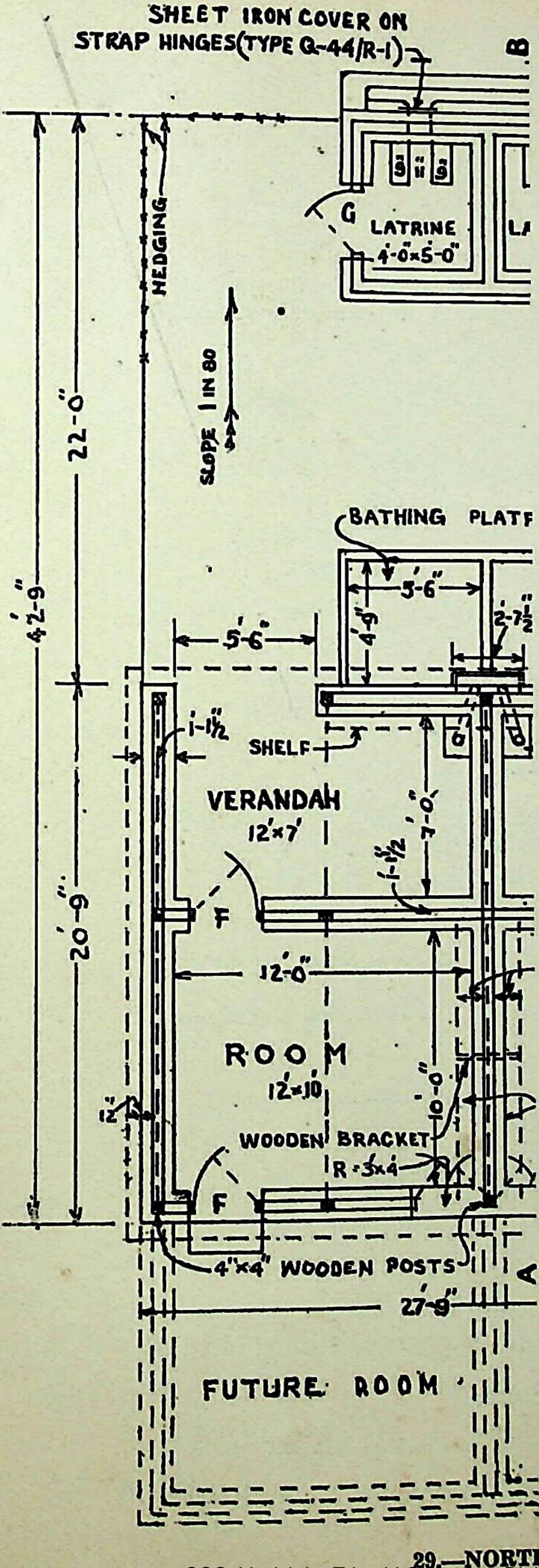
Special Features

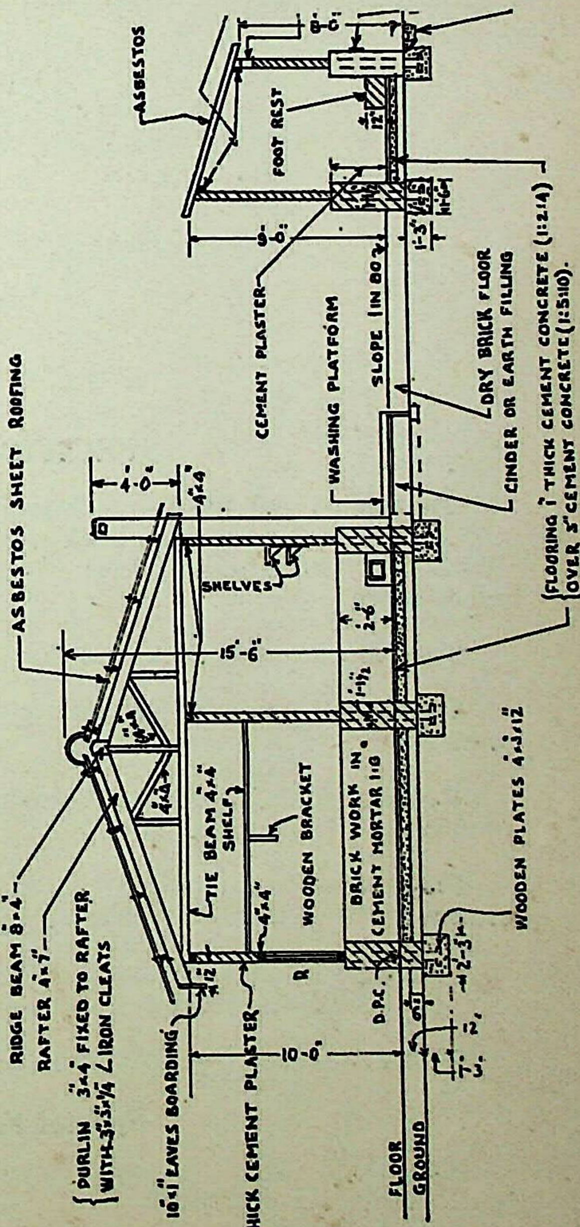
1. Bathing platform 5′-6″ × 4′-9″.

2. Shelves have been provided for storage etc.

3. The superstructure above 2′-6″ is of brick in mud panels between wooden posts of 4″ × 4″ sections.







29.—NORTHERN RAILWAY.

30

This house of Northern Railway has been found suitable for the various regions in which this Railway operates. It is based on traditional design and traditional material.

DATA

1. Floor area . . . . 313 s. ft.
2. Plinth area . . . . . . 390 s. ft.
3. Cost as per railway . . . . . . Rs. 2,689/-
   „ „ Delhi Schedule . . . . . Rs. 2,987/-

	Railway Rs.	Delhi Rs.
4. Plinth area rate	6/14/-	7/11/- s. ft.
5. Floor area rate	8/9/-	9/9/- s. ft.

SPECIFICATIONS

Foundation and Plinth—1′-9″ deep and 1′-6″ wide. 9″ thick cement concrete 1:5:10. 2nd class brick work in cement mortar 1:8, 13½″ wide. Plinth is 1′ above ground level. 1″ thick cement concrete 1:2:4 damp proof course.

Superstructure—9″ thick, 2nd class brick work in cement mortar 1:8.

Doors and Windows—Softwood glazed and penalled doors and glazed windows.

Roofing—R.C.C. Roof over room and varandah. Asbestos sheet roofing over kitchen and W.C.

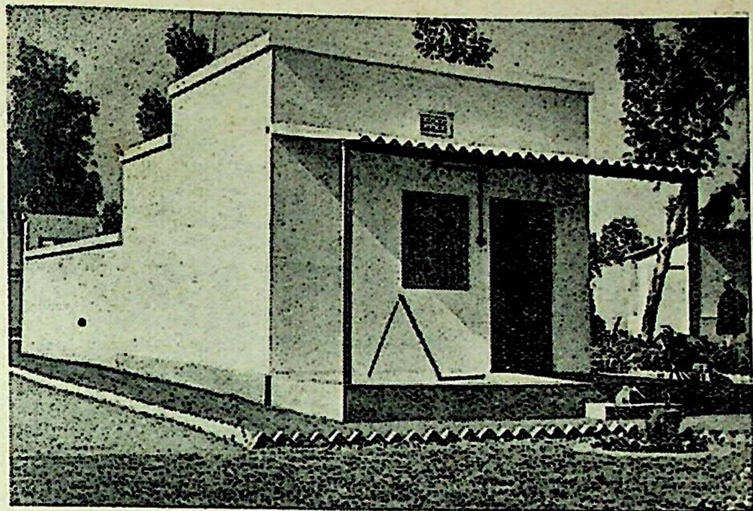
Finishing—Cement plaster 1:8 in cement mortar inside and 1:3 cement mortar outside and white washed.

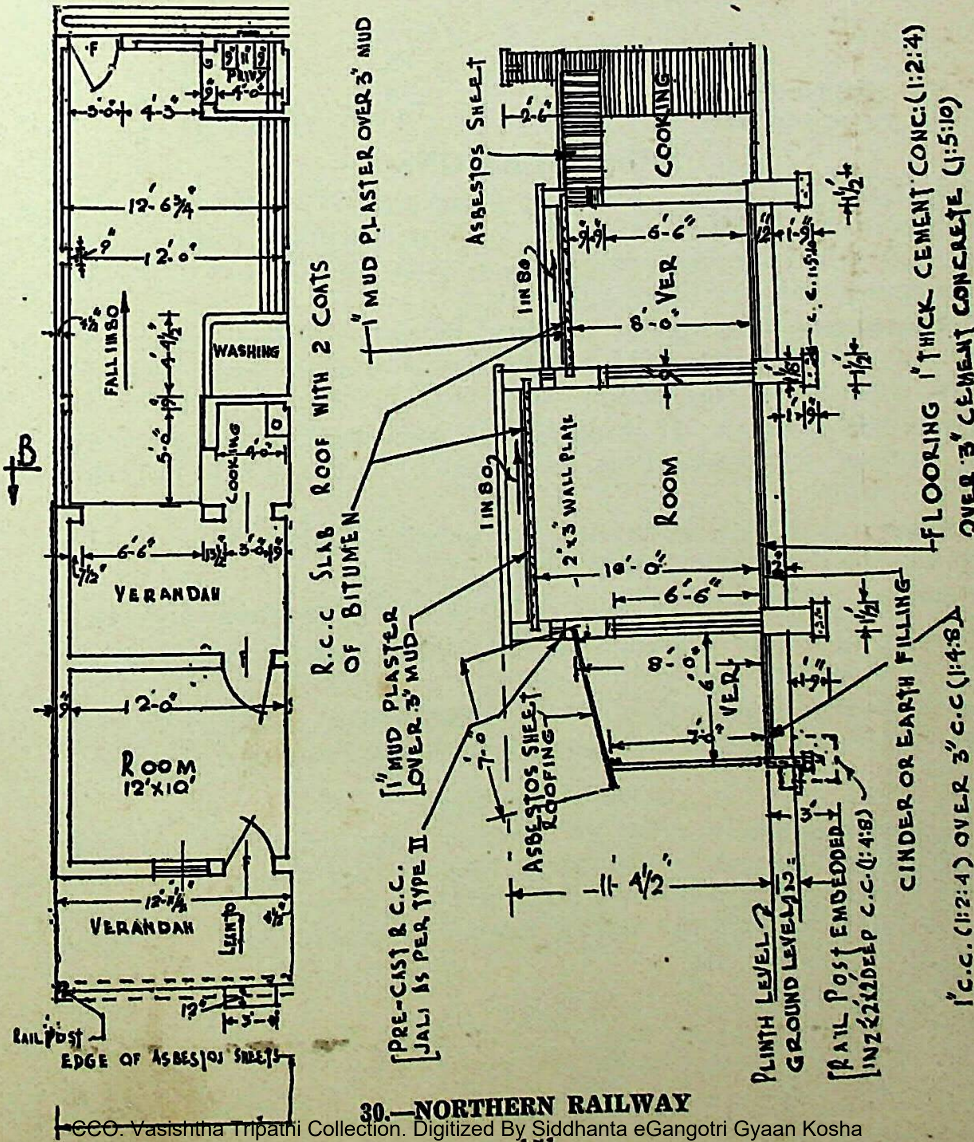
Flooring—1″ thick cement concrete 1:2:4 over 3″ cement concrete 1:5:10. Dry brick flooring in courtyards.

Services—Indian type W.C. with sewage arrangements and electricity.

Special Features

R.C.C. slab over room and varandah with 2 coats of bitumen. Dry brick flooring in courtyard.





30.—NORTHERN RAILWAY

31

This house designed and constructed by the Government of Assam, is particularly suitable for areas with very heavy rain-fall. It uses bamboo and cement for walls and galvanised iron sheets for the roof.

DATA

1. Floor area . . . . 250 s. ft.
2. Plinth area . . . . 282 s. ft.
3. Cost as per Assam Government (including cost of services and copmound wall) . Rs. 3,400/-

   Cost as per Delhi schedule of rate . . . . Rs. 3,550/-

	Assam	Delhi
	Rs.	Rs.
4. Plinth area rate	12/1/-	12/9/-
5. Floor area rate	13/10/-	14/3/-

SPECIFICATIONS

Foundation and Plinth—1′-4″ deep foundations (15″ × 15″ wide) for wooden posts, 4″ deep cement concrete 1 : 4 : 8 at bottom and then 9″ × 9″ × 2′-6″ filled with 1:3:6 upto plinth level, 5″ brick walling in 1:3 cement mortar upto plinth. No damp proof course.

Superstructure—The roof is supported by local teakwood frame work on 4″ × 4″ wooden posts. The walling consists of single wattle and split bamboo crete walling with cement plaster in C.M. 1 : 6 proportion.

Doors and Windows—1″ thick, 1st class local wood or 2nd class teak-wood, battened and braced doors and windows. M.S. bars have been provided in windows.

Roofing—24 B.W.G. corrugated iron sheeting supported on wooden trusses and purlins for the sloping roof.

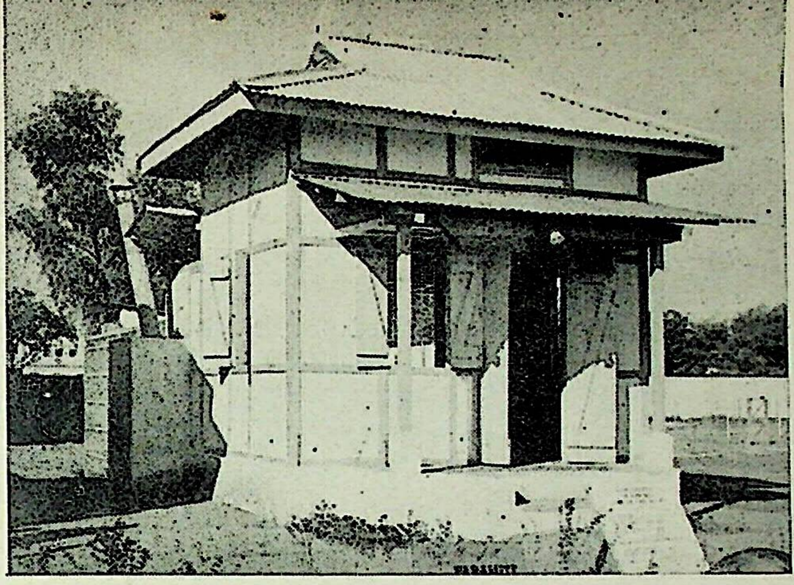
Finishing—White washing walls and painting of doors and windows.

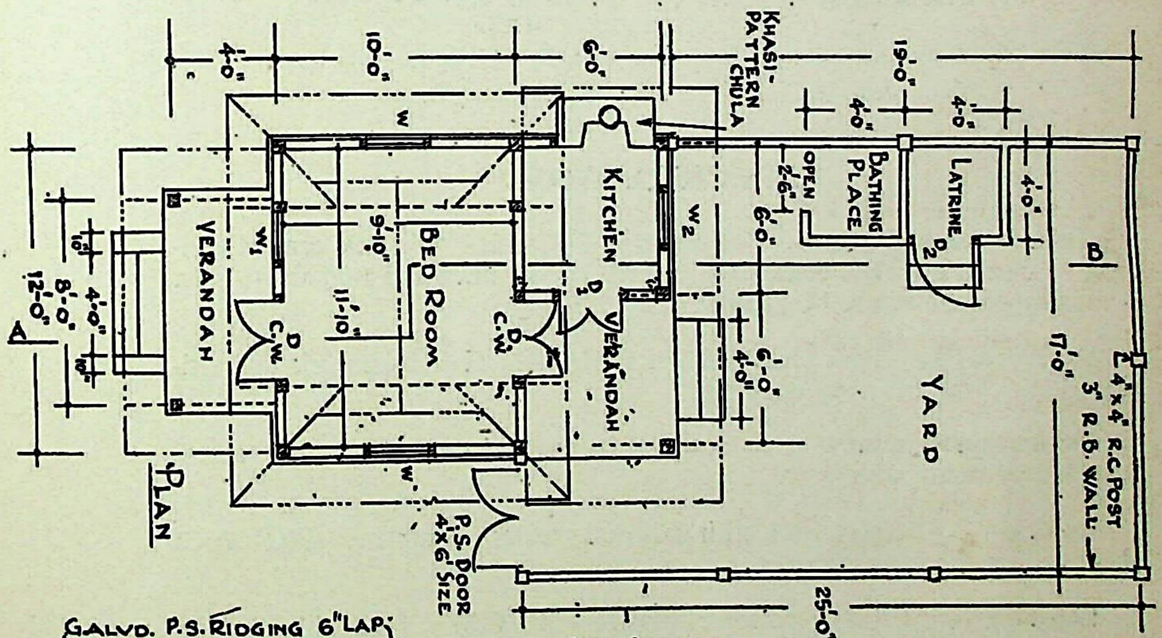
Flooring—Brick on edge flooring interstesis filled up with sand and cement pointing with C.M. 1:1 on top.

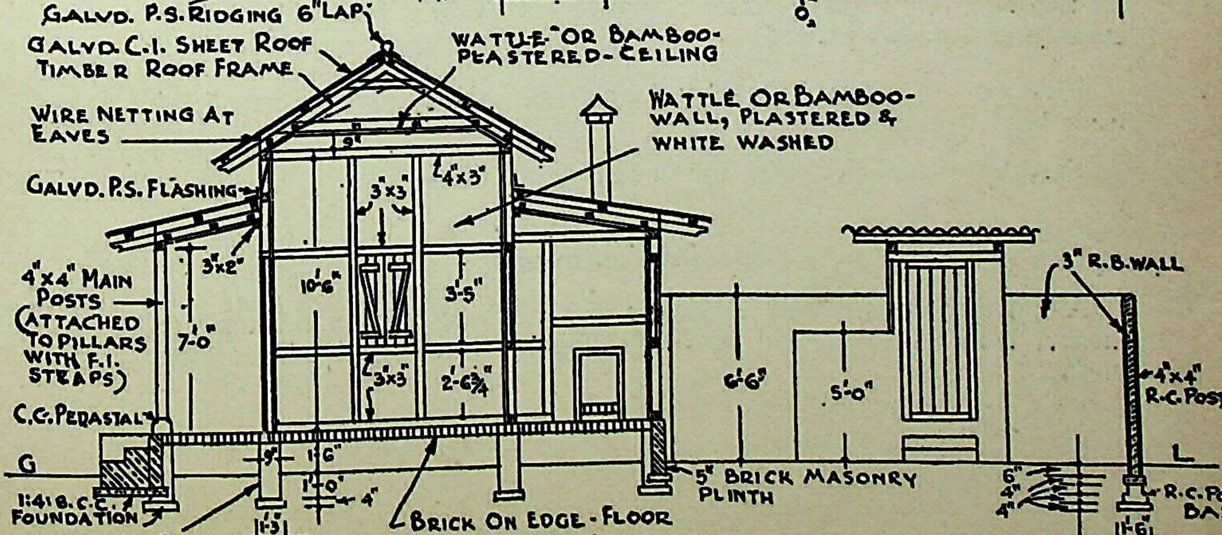
Services—One Indian type W.C. with flushing arrangement and connections, one water tap, a bathing platform and 5 electrical points.

Special Features

The structure consists of 4″ × 4″ wooden posts adequately fixed and carrying the roof through wooden trusses which in their turn have C.I. sheet Roofing. The walling consists of single wattle/split bamboo crete walling plastered on both sides with cement mortar 1 : 6 and finished with white washing.







SECTIONAL ELEVATION ON A.B

31.—GOVERNMENT OF ASSAM.

32

A cheap one-roomed house constructed by the Military Engineering Service.

DATA

1. Floor area . . . . . . 251 sq. ft.
2. Plinth area . . . . . 324 sq. ft.
3. Cost at Delhi . . . . . Rs. 3,300/-/- Delhi
4. Plinth area rate. . . Rs. 10/2/11 sq. ft. includes courtyard.
5. Floor area rate. . . Rs. 13/2/5 sq. ft.

SPECIFICATIONS

Foundation and Plinth—1′-6″ deep, 1′-7½″ wide. 6″ thick cement concrete. 1:4:8: First class brickwork in C.M. 1:6, 9″ thick and 1-0″ above G.L. The damp proof course of ¾″ thick C.M. 1:3.

Superstructure—First class B.B. in C.M. 1:6. Half brickwork in partitions. Brick arches over openings.

Doors and Windows—Deodarwood doors and windows with frames-panelled or semi-glazed.

Roofing—A.C. sheet roof with salwood trusses complete. Flat A.C. sheet ceiling for main room.

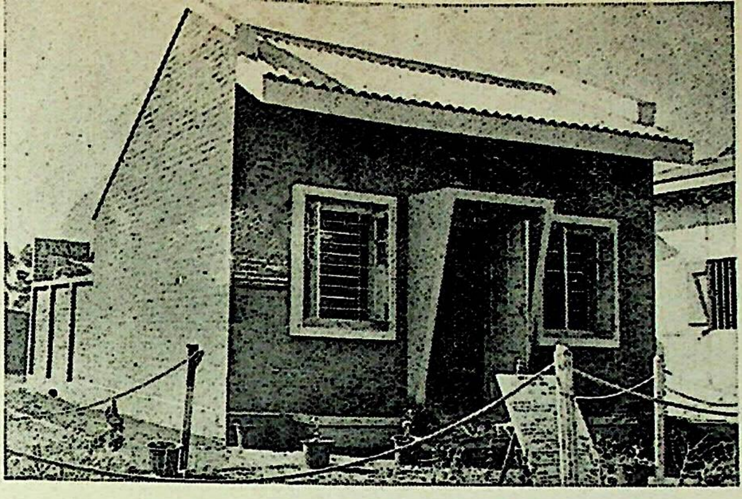
Finishing—½″ thick cement plaster in C.M. 1:6 whitewashed. Doors and windows painted.

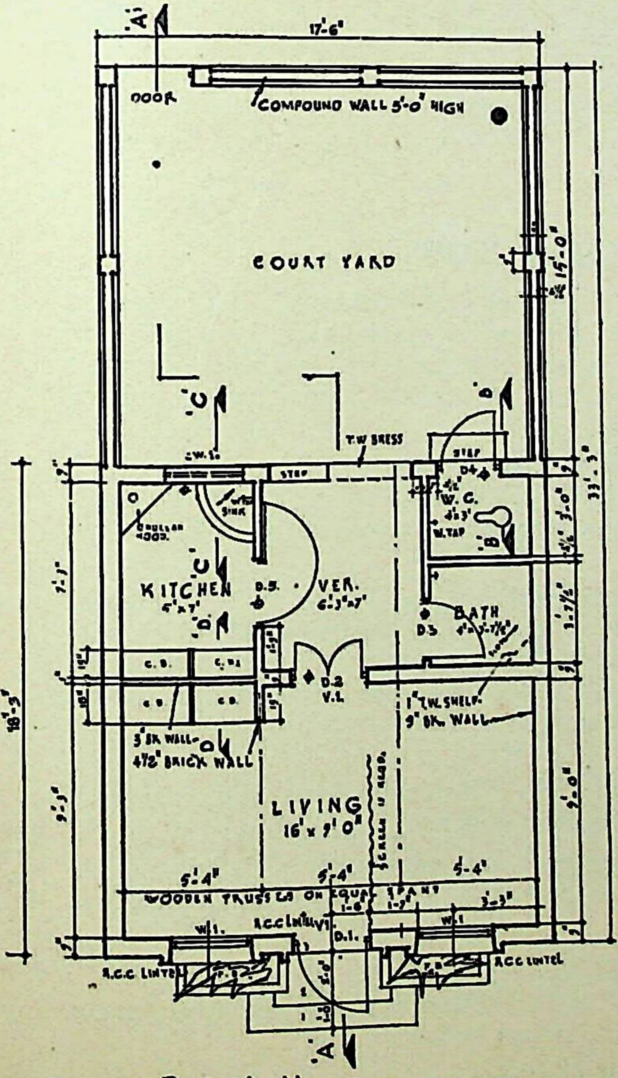
Flooring—1½″ thick C.C. 1:2:4: floor over 3″ thick lime concrete 1:3:6 using brick aggregate.

Services—Usual electricity and sanitary installations.

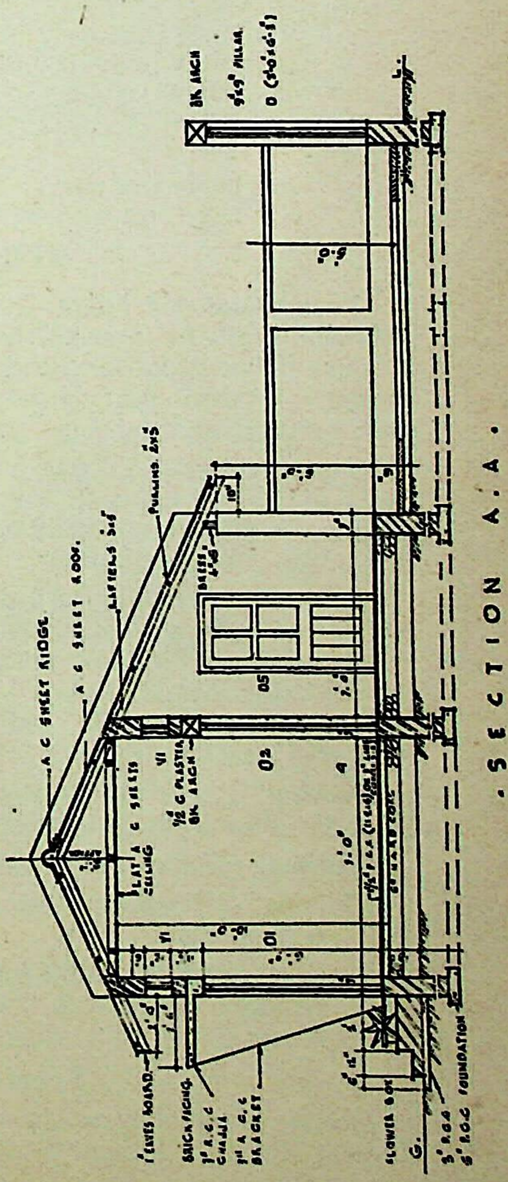
Special Features

A single room is placed lengthwise giving a long rear verandah where kitchen, bath and W.C. are provided. Big open courtyard adds to the comfort.





. PLAN.
. SCALE 1" = 4'-0"



—HOT AND WET—

32.—MILITARY ENGINEERING SERVICE.

33

There are, for various reasons, places where bricks are extremely costly- This model house, put up by the Concrete Association of India, uses cement-sand hollow blocks instead of bricks, but you must be able to get cheap sand. Hollow blocks are a comparatively novel innovation in India and their curing requires special expert attention. The two or three months required for good curing is a period well-spent—otherwise the walls will begin to crack.

DATA

1. Floor area . . . . . . 384 sq. ft.
2. Plinth area . . . . . . 481 sq. ft.
3. Cost as per Association . . . . Rs. 4,540/-/-
   Cost as per Delhi Schedule of rates . . Rs. 4,019/-/-

	Association	Delhi Schedule.
4. Plinth area rate . . .	Rs. 9/7/-	Rs. 8/6/- sq. ft.
5. Floor area rate . . .	„ 11/13/-	Rs. 10/8/- sq. st

SPECIFICATIONS

Foundations and Plinth—2′-4″ deep and 1′-4″ wide, 8″ thick cement concrete 1:5:10 for foundations. Masonry upto plinth level consists of 8″ thick hollow block filled with cement concrete 1:5:10 and layed in cement mortar. 1″ thick damp proof course. 1 cement:2 sand mortar finished with bitumanastick topping.

Superstructure—Concrete hollow block masonry laid in mortar 1:1:8. Exterior and bearing walls will be 8″ thick and partition walls 4″ thick. Masonry in the layer directly below the roof level will be of concrete solid block laid in cement mortar.

Doors and Windows—All doors and windows frames will be precast. Reinforced concrete units. Door shutters will be of timber 1¼″ thick with suitable fittings. Window shutters will be of timber 1″ thick glazed and panelled with suitable fittings. All windows will be provided with precast cement concrete slab sills and sunshades. Ventilators will be of precast reinforced concrete (Z type).

Roofing—Reinforced concrete slabs. Insulation layer will consist of 3″ earth followed by 3/4″ thick cement concrete plain tiles.

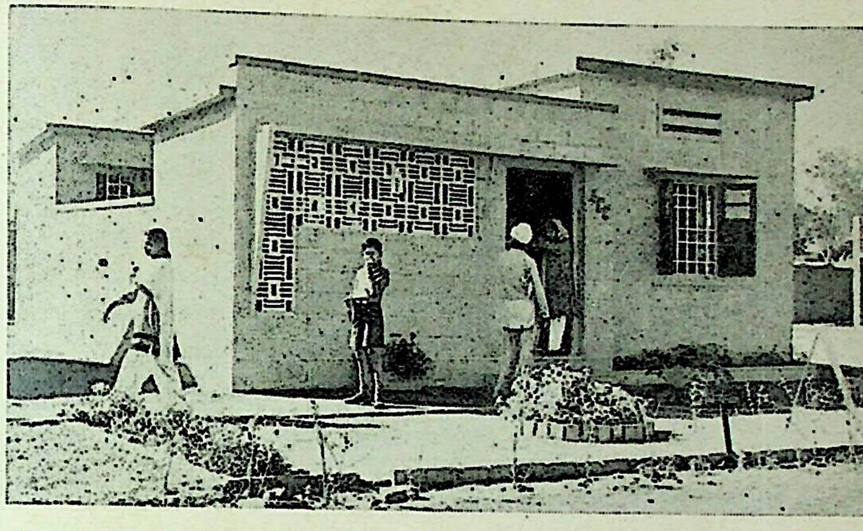
Finishing—Cement wash on exterior and colourwash on interior.

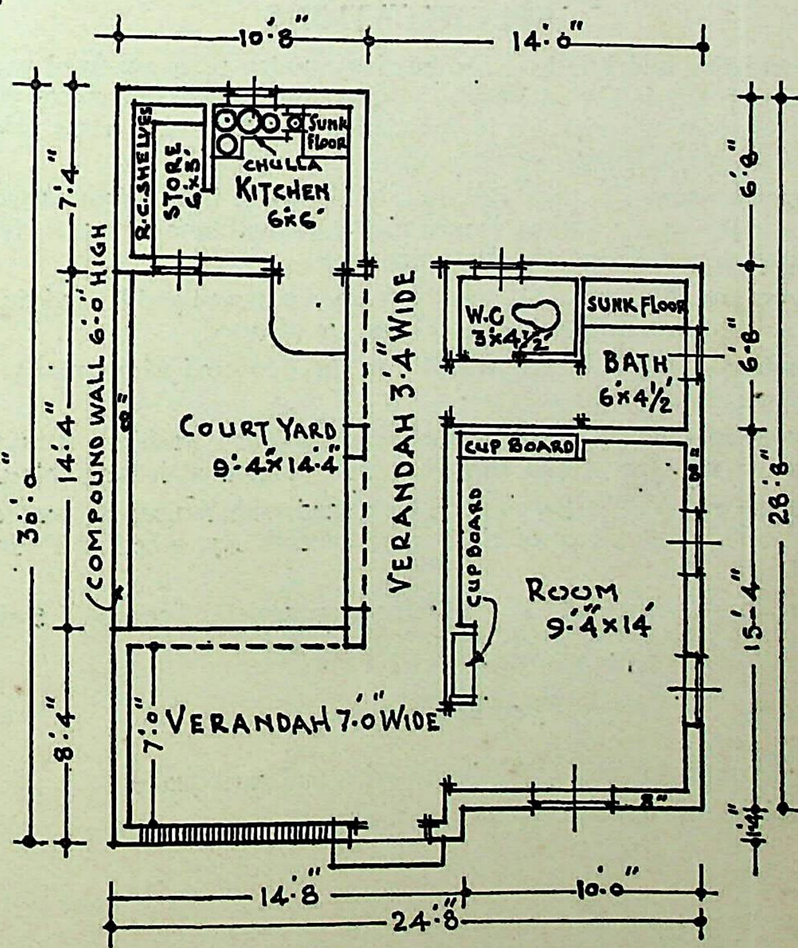
Flooring—2½″ thick consisting of 2″ cement concrete 1:3:6 and ½″ layer of 1:3 cement mortar.

Services—(a) Electricity 5 light and 2 plug points.
(b) Sanitary Indian type W.C. with flushing and drainage arrangement.
(c) Water supply water taps in kitchen and bath.

Special Features

Hollow block construction of walls in mortar 1:1:8 R.C.C. roof with slope of 1 in 25. Without the usual water proofing course.





PLAN

33.—ASSOCIATED CEMENT COMPANIES

34

This is a house suitable for areas with a very heavy rainfall. It is constructed with woven bamboo and plaster with cement mortar on both sides. The framework consists of wooden posts which support the roof of G.I. sheets. The sheets are covered with country tiles to avoid the excessive heat of summer.

DATA

1. Floor area . . . . 382 sq. ft.
2. Plinth area . . . . 472 sq. ft.
3. Cost at Delhi . . . . . . Rs. 4,920/-/-
4. Plinth area rate . . . . . Rs. 10/7/- sq. ft.
5. Floor area rate . . . . . Rs. 13/-/- sq. ft.

SPECIFICATIONS

Foundation and Plinth—Load bearing wooden posts are fixed with steel clamps embeded in C.C. 1:3:6 9″ × 9″ over foundation concrete of 6″ deep. The work over 6″ thick 1:5:10 foundation concrete. 2nd class brickwork is now for panel walls.

Superstructure—3″ thick B.B. in C.M. 1:4 up to 2′-9″ height above plinth level over this wattle walling cement plaster 1:6 and lime punned. 1½″ thick brick partitions for kitchen. W.C. and bath.

Doors and Windows—1½″ thick soft wood battened and braced doors and windows, with iron fittings, window bars, are of wood.

Roofing—24 B.W.G. corrugated iron sheet covered with country tiles in the main room.

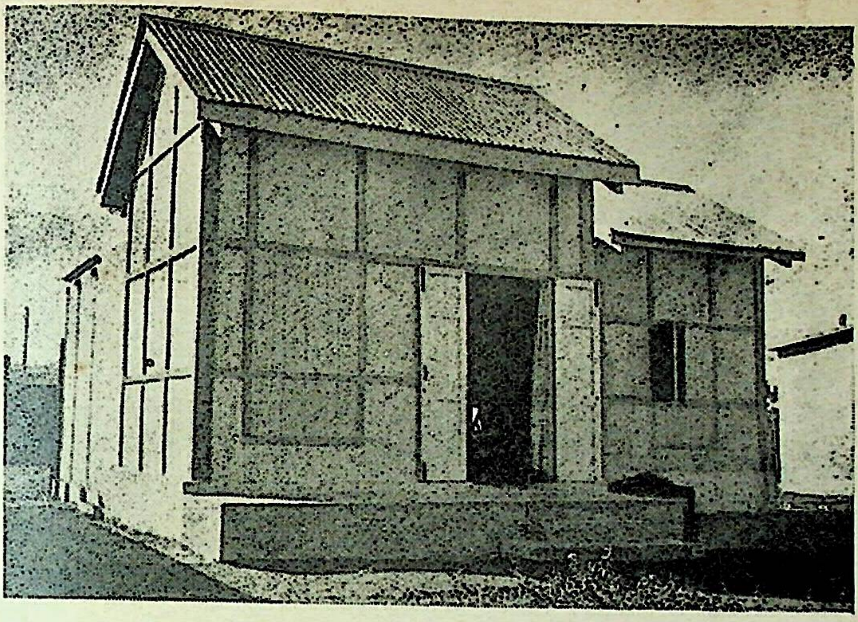
Finishing—Whitewashing inside and colour washing outside the superstructure. Doors and window panels painted with buff colour.

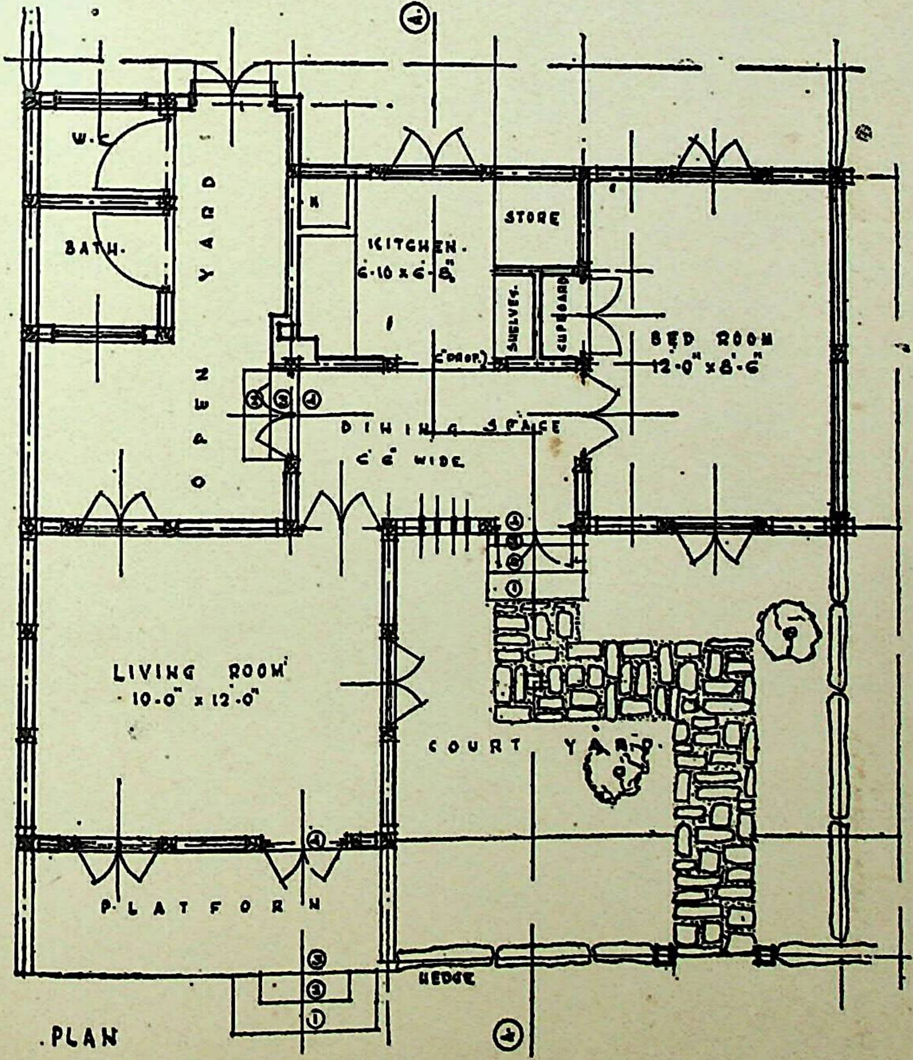
Flooring—1″ C.C. flooring 1:2:4 finished with a floating coat of neat cement on top and a coat of bitumen underneath over a bed of 3″ dry brick ballast.

Services—Indian W.C. with flushing arrangement, 3 taps and 6 electrical points.

Special Features

1. House fit for areas with heavy rains and earthquake.
2. Light roof of corrugated iron sheets.





.PLAN

34.—CENTRAL P.W.D.—ASSAM MODEL—5.

35

This is a complete timber house put up by the Andamans Public Works Department. The Padoak wood used is superior to Indian teak in some respects. It deserves greater popularity, in hilly regions with heavy rainfall where timber may be cheap.

DATA

1.	Floor area	542 sq. ft.
2.	Plinth area	619 sq. ft.
3.	Cost at Andamans (excluding services)	Rs. 4,938/-/- Port Blair
4.	Plinth area rate	Rs. 8/-/- sq. ft.
5.	Floor area rate	Rs. 9/1/- sq. ft.

SPECIFICATIONS

Foundation and Plinth—Cement concrete (1:4:8) blocks 2'-0" high 1'-0" square with angle iron embeded in it to hold the wooden posts of the house. Plinth height 2'-3" above ground level.

Superstructure—½" thick vertical board wall but jointed with timber beading on to 3" × 3" scantlings fixed to 4" × 4" posts.

Doors and Windows—1½" thick Padoak wood battened and braced doors. Semi glazed and glazed windows.

Roofing—Creosoted shingle roofing on 2" × 1" battens at 5" centres on collar trusses.

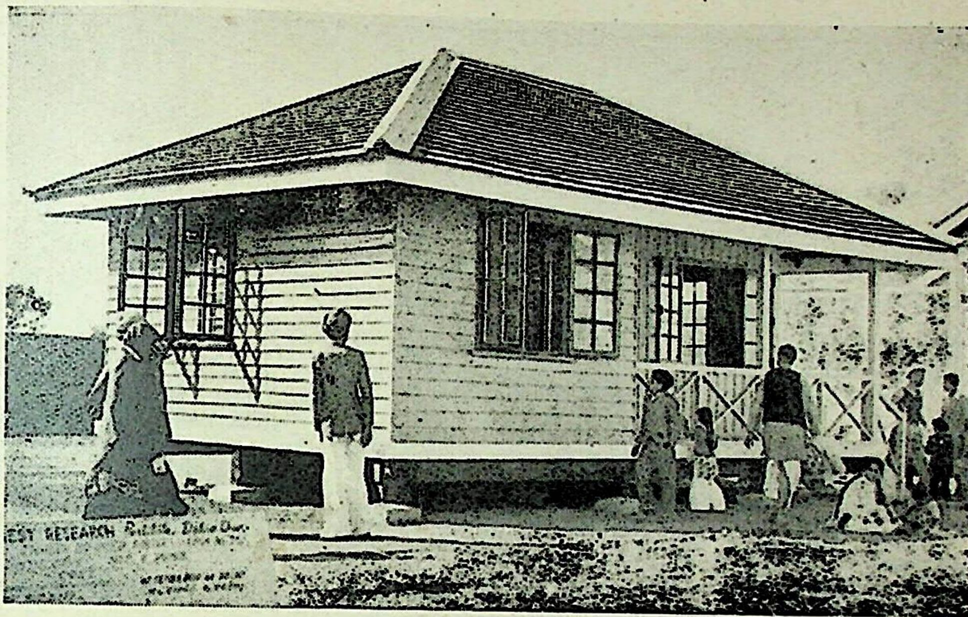
Finishing—Chocolate paint to the outside and white painting to the inside.

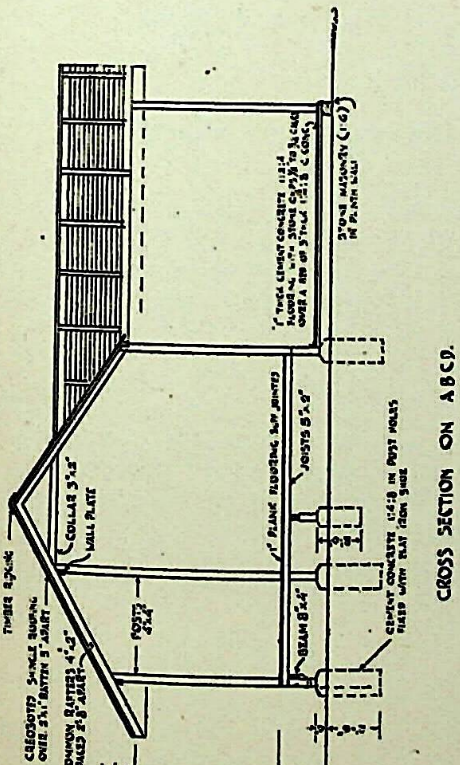
Flooring—1" thick C.C. 1:2:4 flooring over a bed of 3" thick 1:4:8: cement concrete in bath and kitchen, 1" thick wooden plank flooring over frames in living rooms.

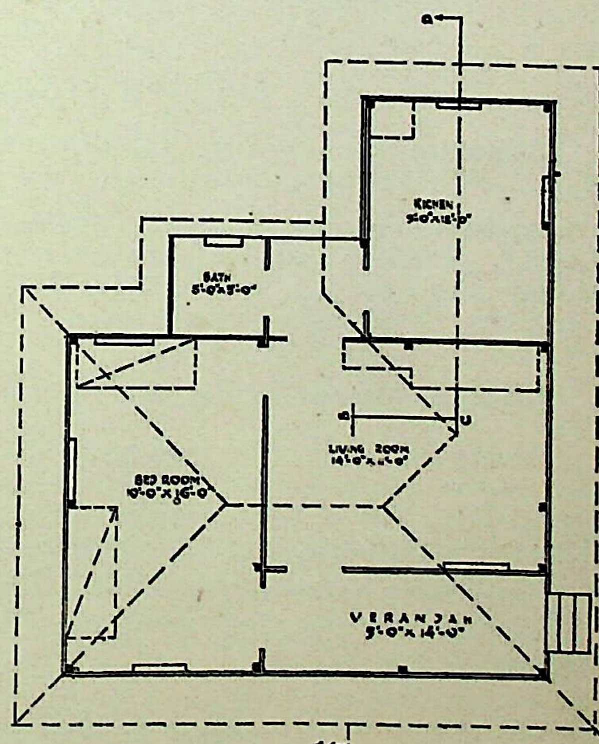
Services—Nil.

Special Feature

The house is entirely built of different sorts of timber available in Andaman and Nicobar Islands.







35.—ANDAMANS P.W.D.

36

This house, designed and constructed by the Forest Research Institute, Dehra Dun, illustrates the slogan, "Wood is good". Timber, bamboo and grass have all been treated and used in this house, which is white-ant-proof and fire proof.

DATA

	Dehra Dun	Delhi
1. Floor area	386 sq. ft.	
2. Plinth area	421 sq. ft.	
3. Cost at Dehra Dun (excluding the cost of services)	Rs. 2,200/-/-	
Cost at Delhi	Rs. 2,680/-/-	
4. Plinth area rate	Rs. 5/4/-	Rs. 6/-/- sq. ft.
5. Floor area rate	Rs. 5/11/-	Rs. 6/15/- sq. ft.

SPECIFICATIONS

Foundation—One foot deep brick foundation below the ground and 9" square. 9" thick brick masonry one foot above ground level.

Superstructure—Built of treated "Chir" timber, thatch grass and bamboo. The side wall along the length will be made of reinforced bamboo mud core. The front and back walls will be made of timber and bamboos. The compound wall will be made of timber pale fencing alround.

Doors and Windows—Glazed windows and wooden doors.

Roofing—The roof of the main house will be covered with thatch grass over bamboo trusses and purlins. The trusses will be supported on timber posts. There will be a timber plank ceiling. The porch will be covered with shingles and back verandah with corrugated bamboo roof.

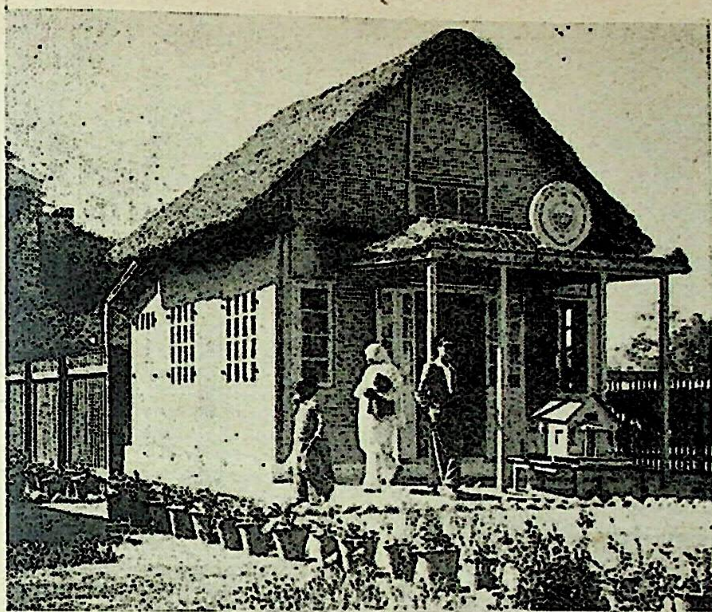
Finishing—The walls will be finished with lime cement plaster.

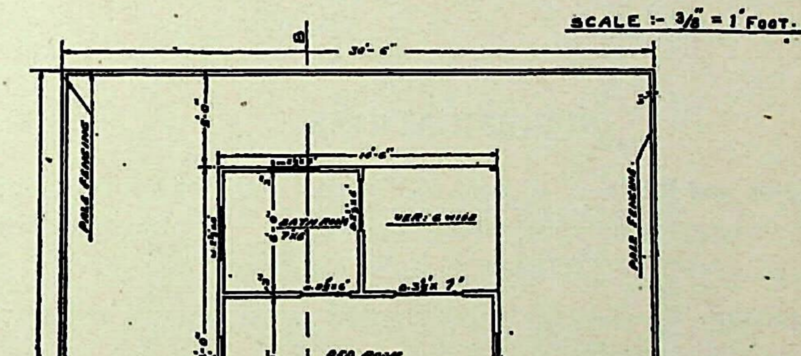
Flooring—Flat brick with cement pointing.

Services—Nil.

Special Feature

The house is designed to exhibit the use of bamboo and thatch wherever available in the country. These materials are adequately treated to make them proof against white ants, vermin and fire etc.





PLAN

36.—FOREST RESEARCH INSTITUTE, DEHRA DUN.

37

This is a house built to traditional specifications by D.L.F. Housing and Construction Ltd. Suitable for North India. It can be built conveniently in blocks of two as semi detached houses.

DATA

1. Floor area	. . .	535 sq. ft.
2. Plinth area	. . . .	634 sq. ft.
3. Cost at Delhi (including services)		Rs. 4,830/-/-
4. Plinth area rate	. . .	Rs. 7/10/- sq. ft.
5. Floor area rate	. . . .	Rs. 9/-/- sq. ft.

SPECIFICATIONS

Foundation and Plinth—2′-0″ wide 2′-3″ deep. 1′-0″ thick lime concrete of 1 lime:3 Badarpur sand and 6 burnt brick ballast. 1st class brick work in lime mortar 1:3 Plinth 1′-0″ above G.L. No damp proof course.

Superstructure—1st class brickwork in mud mortar except jambs, sills which will be in lime mortar 1:3.

Doors and Windows—Deodar wood panelled doors and glazed windows, with fan light.

Roofing—R.C.C. slab with 3″ average lime concrete on top and cement plastered.

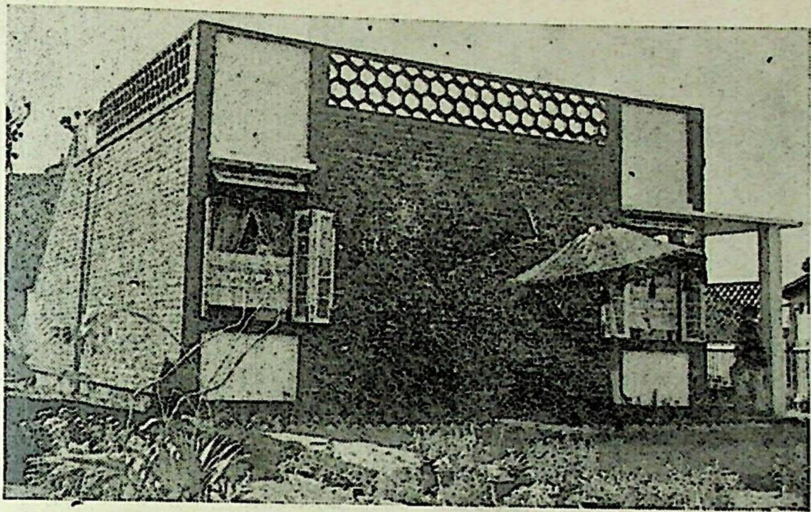
Finishing—½″ thick cement plastered with C.M. 1:4.

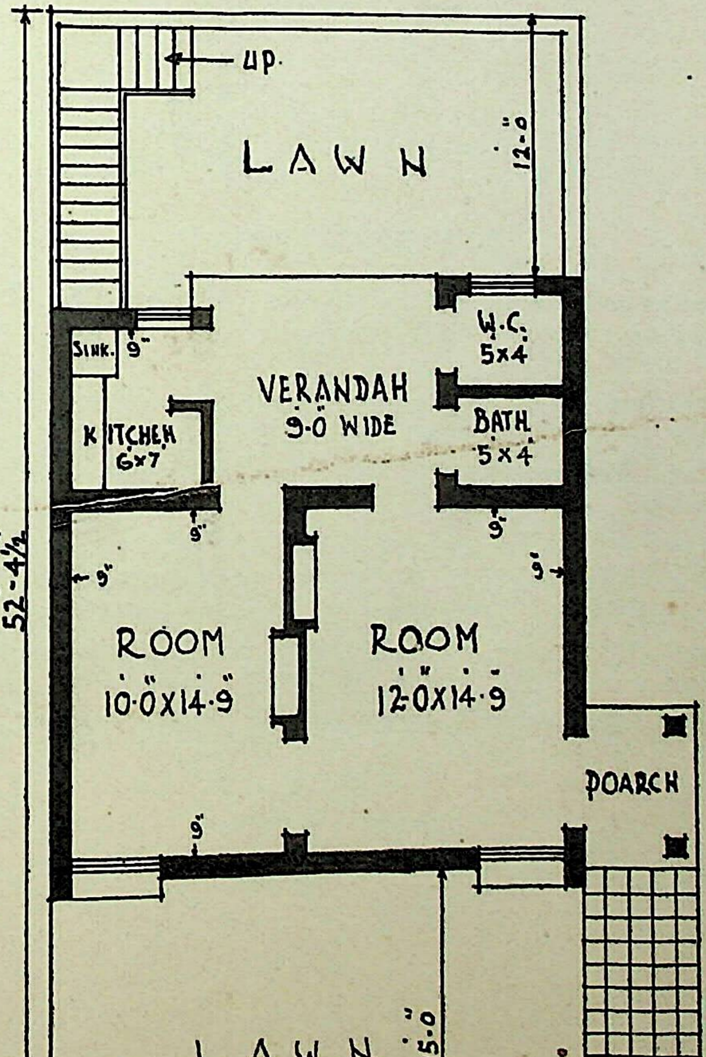
Flooring—1″ thick cement concrete 1:2:4 over a bed of 3″ thick brick ballast in lime mortar 1:3.

Services—Indian type flushing water closet, water taps and electric points.

Special Features

1. Wide back verandah.
2. Open stairs to terrace.





37.—DELHI LAND AND FINANCE (D.L.F.)

38

Black cotton soil presents some difficult building problems. Owing to the fact that it shrinks and cracks in a somewhat unpredictable manner, foundations for normal buildings have to be very deep and strong and on that account are very expensive. This house, put up by the Government of Bhopal, does not have any foundations. It is a R.C.C. frame structure on reinforced cement concrete raft. The rigidity of the frame protects it against the idiosyncrasies of the soil.

DATA

		Bhopal	Delhi
1. Floor area	424 sq. ft.		
2. Plinth area	6 10 sq. ft.		
3. Cost at Bhopal (including services)	Rs. 5,000/-/-		
Cost at Delhi	Rs. 5,640/-/-		
4. Plinth area rate		Rs. 8/4/-	Rs. 9/4/- sq. ft.
5. Floor area rate		Rs. 11/12/-	Rs. 12/13/- sq. ft.

SPECIFICATIONS

Foundation and Plinth—No excavation. Plinth R.C.C. beams on consolidated morrum. Plinth 18″ high. No damp proof course. The raft beams size 9″ × 15″.

Superstructure—Brick in mud, in between R.C.C. frame consisting of R.C.C. posts, R.C.C. plinth beam and tire beam at roof level.

Doors and Windows—Country teak wood—G.I. sheet, panelled shutters without frames. Iron fittings.

Roofing—Tiled roofing over wooden roof trusses.

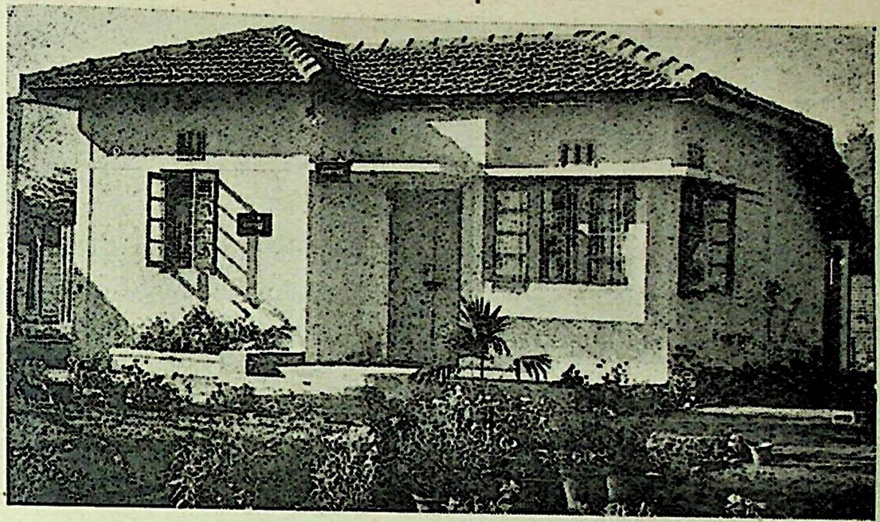
Finishing—½″ thick plaster in C.M. 1:4 externally and ½″ thick plaster in C.M. 1:5 internally. Light green and blue finish inside the rooms.

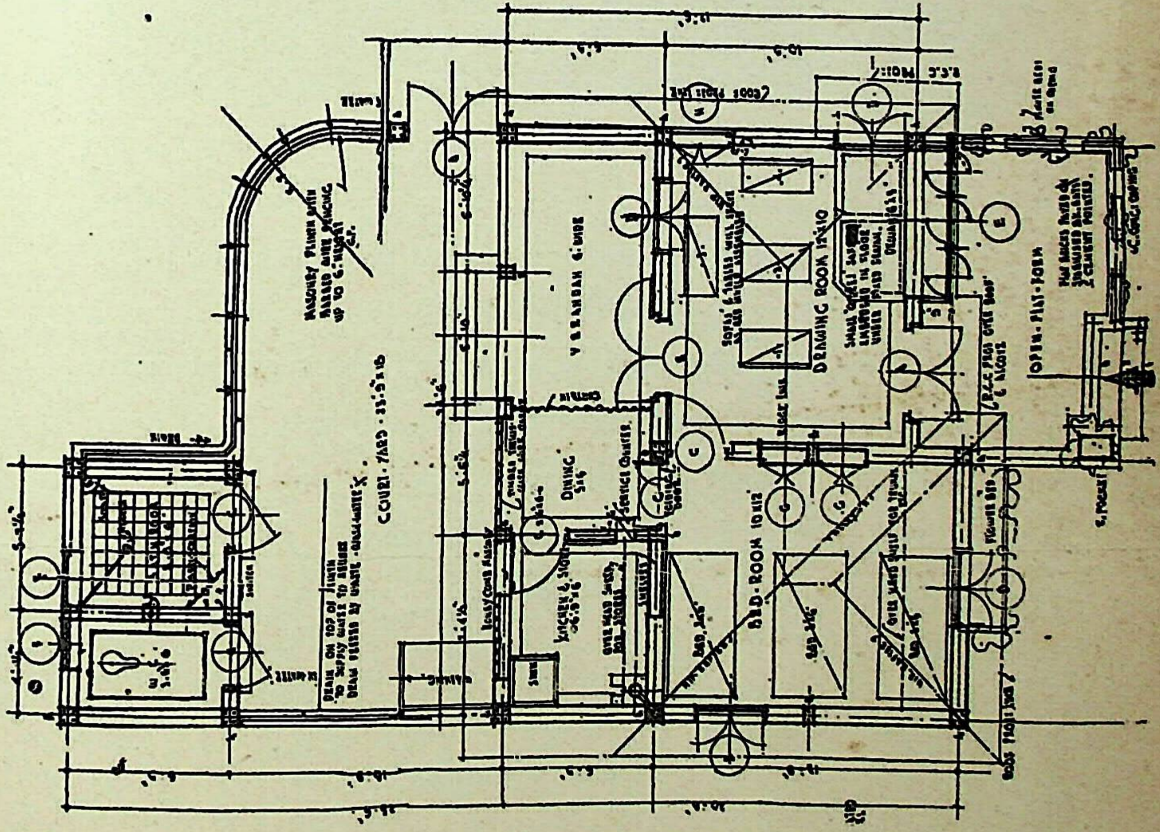
Flooring—R.C.C. slab 5″ thick, also to act as a raft connected with plinth beams.

Services—Indian pattern W.C. with flushing arrangement. Water tap and electricity.

Special Features

1. R.C.C. frame structure on raft foundation.
2. R.C.C. raft to act as a floor.





38.—GOVERNMENT OF BHOPAL.

39

If bricks and other ordinary materials cannot be easily obtained, but a house has to be put up very quickly, this Aluminium house is the solution. It is extremely light and portable—and requires very little finishing.

DATA

1. Floor area	. . . . . .	450 sq. ft.
2. Plinth area	. . . . . .	450 sq. ft.
3. Cost at Delhi	. . . .	Rs. 4,738/-/-
		Delhi
4. Plinth area rate	. . . . . .	Rs. 10/8/- sq. ft.
5. Floor area rate	. . . . . .	Rs. 10/8/- sq. ft.

[The cost given here has been supplied by the Exhibitor.]

SPECIFICATIONS

Foundatio and Plinth—Light foundation using brick in cement mortar.

Superstructure—Troughed aluminium corrugated sheets.

Doors and Windows—Troughed aluminium corrugated sheets.

Roofing—Troughed aluminium corrugated sheets.

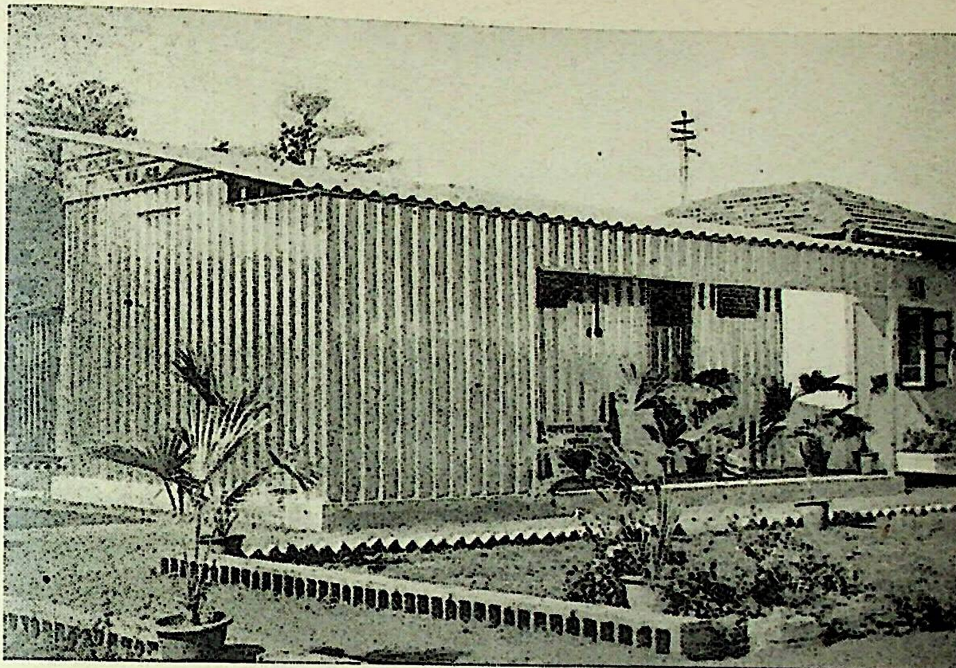
Flooring—Cement concrete flooring.

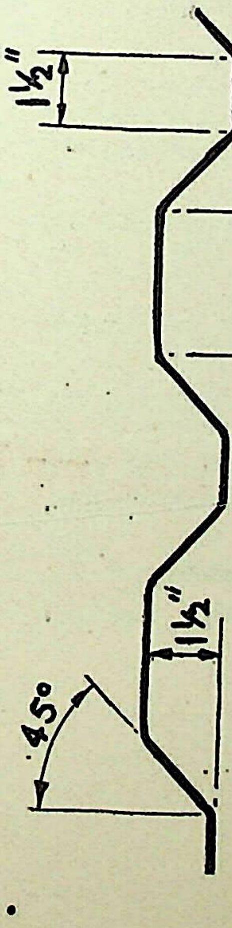
Finishing—Nil.

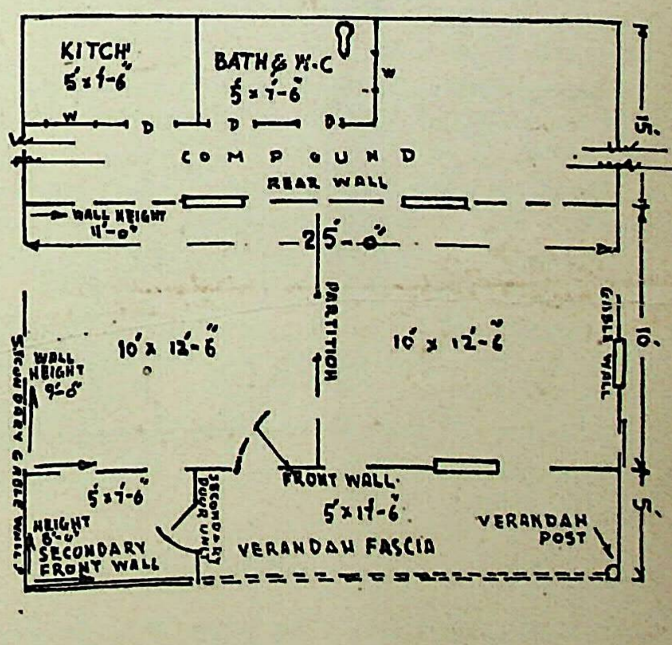
Services—One W.C. and tap.

Special Features

1. Portable.
2. Light construction.
3. No finishing recommended as the aluminium does not rest.







39.—INDIAN ALUMINIUM Co. Ltd.

40

This one-roomed house designed by the Hindustan Block Manufacturing Co., has of hollow cement cinder blocks in the walls. Good ventilation and insulation make it suitable for hot and humid regions. It will be economical where bricks are expensive and good cinder is available cheaply.

DATA

(For two houses)

		Bengal		Delhi		
1. Floor area	492 sq. ft.					
2. Plinth area	606 sq. ft.					
3. Cost at Calcutta	Rs. 4,980					
Cost at Delhi	Rs. 3,920					
		Rs.	a.	Rs.	a.	
4. Plinth area rate		8	3	6	7	sq. ft.
5. Floor area rate		10	0	8	0	sq. ft.

[The costs given here have been supplied by the Exhibitor.]

SPECIFICATIONS

Foundation and Plinth—1′-9″ deep 1′-6″ wide for main walls and 10″ wide for partitions. 4″ thick C.C. 1 : 4 : 8. Brickworks 9″ for walls and $4\frac{1}{2}$″ for partitions in C.M. 1 : 6.

Superstructure—8″ thick cinder concrete hollow block masonry in C.M. 1 : 4 for walls and 4″ thick cinder concrete hollow blocks in C.M. 1 : 4 for partitions.

Doors and Windows—$\frac{3}{4}$″ thick ledged and braced, door and window shutters. $1\frac{1}{2}$″ thick glazed windows. $\frac{5}{8}$″ bar gratings to windows.

Roofing—3″ thick slab for room and $2\frac{1}{2}$″ thick slab for verandah etc. over a 'Tee' beam.

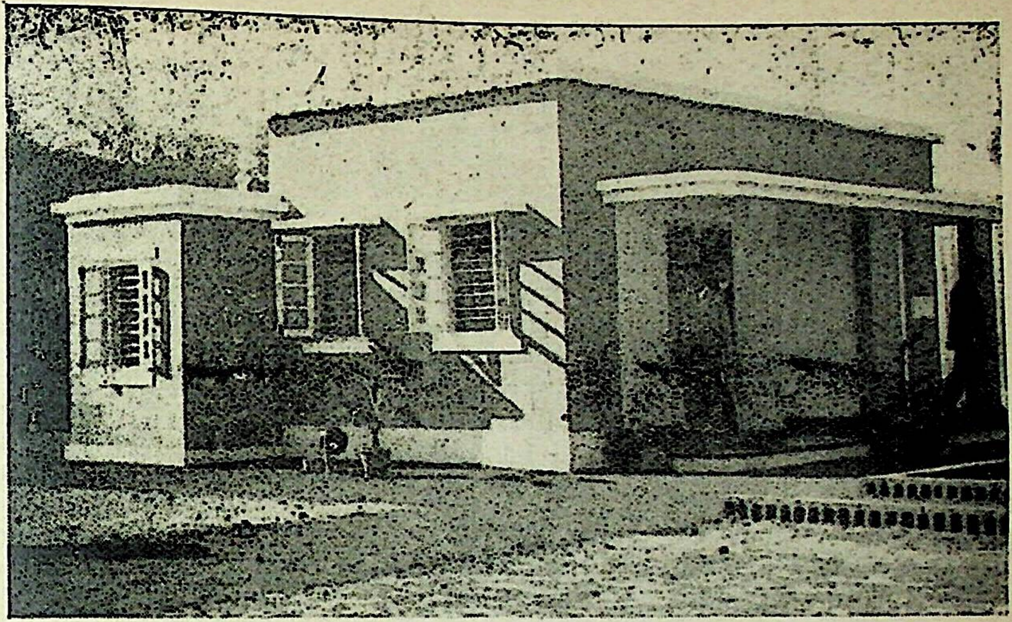
Finishing—Flush pointing to plinth and plaster to walls with C.M. 1 : 6. $\frac{1}{4}$″ thick grey cement dadoo doors and windows painted. Colour washing to walls.

Flooring—1″ thick artificial stone flooring on flat brick bedding.

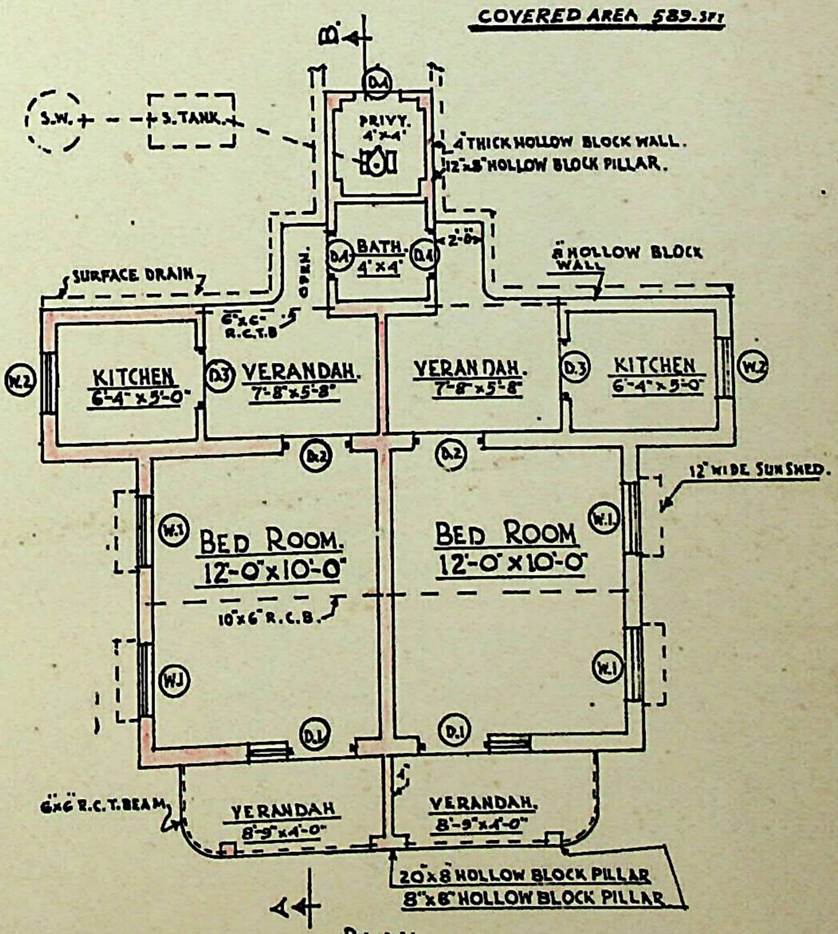
Services—Septic tank for 6 users, W.C. connected with tank, taps and electric points.

Special Features

1. Cinder cement concrete hollow block for superstructure.
2. Attached septic tank.



SCALE. 8 FT = 1" INCH.



PLAN.

40.—HINDUSTAN BLOCK MANUFACTURING Co. LTD., WEST BENGAL.

41

A compact house for all climates, put up by the Bombay Housing Board for the Government of Bombay. It is suitable for low income groups in rural and suburban areas. The Acqua Privy makes it self-contained sanitary—even if there is no underground sewerage. Only traditional materials are used and it is easy to build.

DATA

1. Floor area . . . . 293 sq. ft.
2. Plinth area . . . . 386 sq. ft.
3. Cost at Bombay / Cost at Delhi rates } (including internal services) { Rs. 3,063/- / Rs. 2,450/-

	Bombay Rs.	Delhi Rs.
4. Plinth area rate	8-10-7	6-6-0 sq.ft.
5. Floor area rate	10-7-0	8-6-0 sq. ft.

SPECIFICATIONS

Foundation and Plinth—2′ deep for main walls, 1′ for cross walls. 6″ thick C.C. 1:5:10. 2nd class B.B. C.M. 1:6 and exposed faces pointed with C.M. 1:2 and 2 coats of red geroo finish.

Superstructure—2nd sort B.B. in C.M. 1:6. Partition walls 4½″ thick in C.M. 1:4.

Doors and Windows—Country T.W. 1″ thick false panelled 3″ × 4″ wood frame. 3 coats of painting. Windows provided with 5/8″ M.S. bars.

Roofing—4″ thick sloping roof. Asbestos cement roof for bath and W.C. over country teak sawn scantlings.

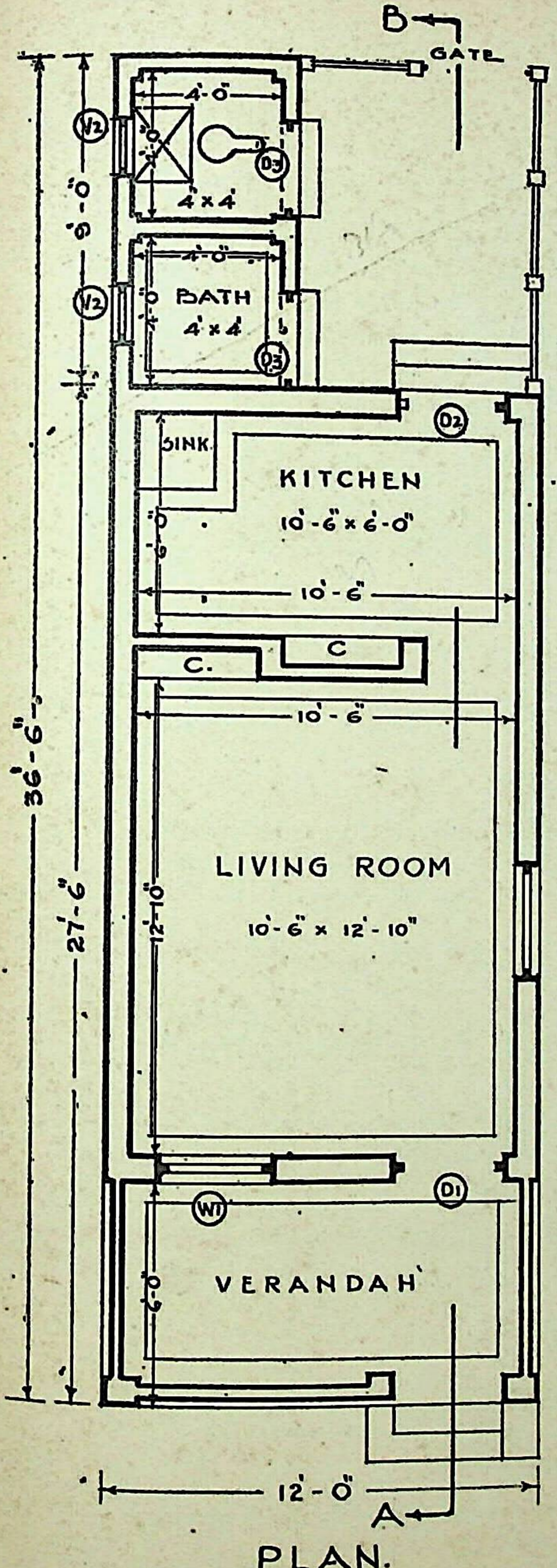
Finishing—Pointed with C.M. 1 : 4 externally and inside plastered with C.M. 1 : 4½″ thick, 3 coats of red geroo wash.

Flooring—1″ C.C. 1 : 2 : 4 patent stone over 4½″ thick C.C. 1 : 5 : 10.

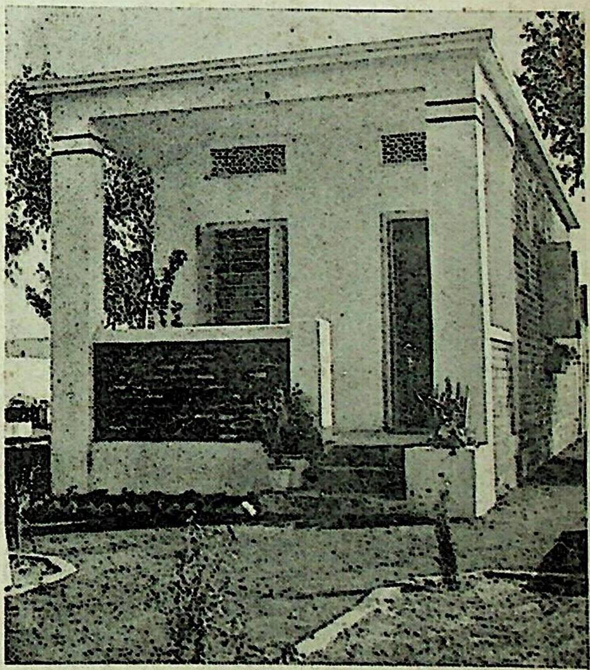
Services—Aqua Privy with Indian glazed pan.

Special Features

1. Aqua Privy with no external service provision.
2. Height of roof slopes from 9′-4½″ to 9′-1½″.
3. No wall to full height between roofs and kitchen.
4. Precast R.C.C. courtyard wall in between columns and flat brick paving for flooring in courtyard.



PLAN.



41.—GOVERNMENT OF BOMBAY—HOUSING BOARD.

41 (a)

A second house put up by the Government of Bombay. The only difference between model house of plot No.—and this one is the addition of one room.

DATA

1.	Floor area	. 319 sq. ft.
2.	Plinth area	. 399 sq. ft.
3.	Cost at Bombay	. Rs. 4,025/-
	Cost at Delhi (including Services) .	. Rs. 3,220/-

		Bombay Rs.	Delhi Rs.
4.	Plinth area rate	10/-/-	8/-/- sq. ft.
5.	Floor area rate	12/10/-	10/-/-sq. ft

SPECIFICATIONS

Foundation and Plinth—2′ deep for main walls 1′ for cross walls. 6″ thick cement concrete C.C. 1:5:10. Plinth and foundation in 2nd class B.B. in C.M. 1:6 (Jumna sand) exposed faces pointed with C.M. 1:2 and 2 coats of red geroo finish.

Superstructure—2nd sort B.B. in C.M. 1:6.

Doors *and* Windows—Country teakwood 1″ thick false panelled. 3″ × 4″ frame for windows and external doors. 3″ × 3″ frame for doors in between rooms.

Roofing—4″ thick R.C.C. sloping roof. Asbestos cement roof on sawn scantling of country teakwood for Bath and Privy.

Finishing—Pointed with C.M. 1:2 externally and painted with red geroo. ½″ C.M. 1:4 plaster inside. Wood work oil painted.

Flooring—1″ C.C. 1:2:4. Patent stone over 4½″ C.C. 1:5:10 bed.

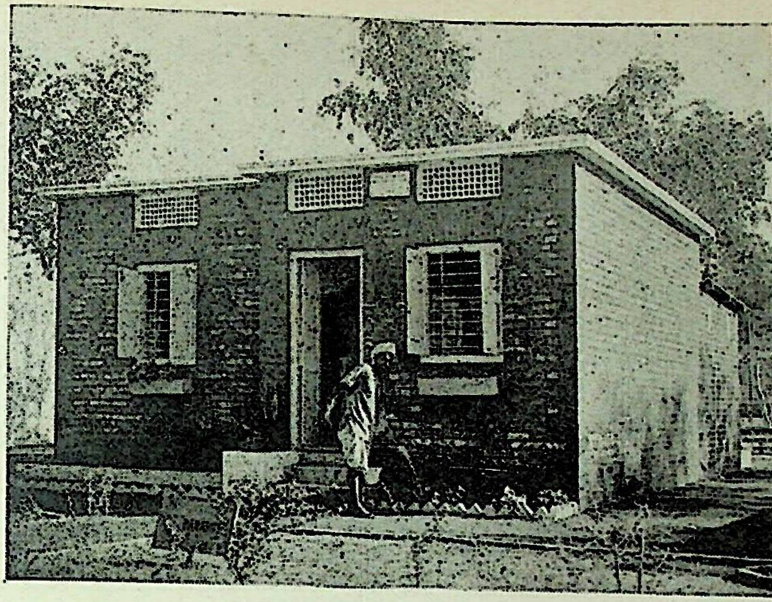
Services—Aqua Privy with Indian glazed pan.

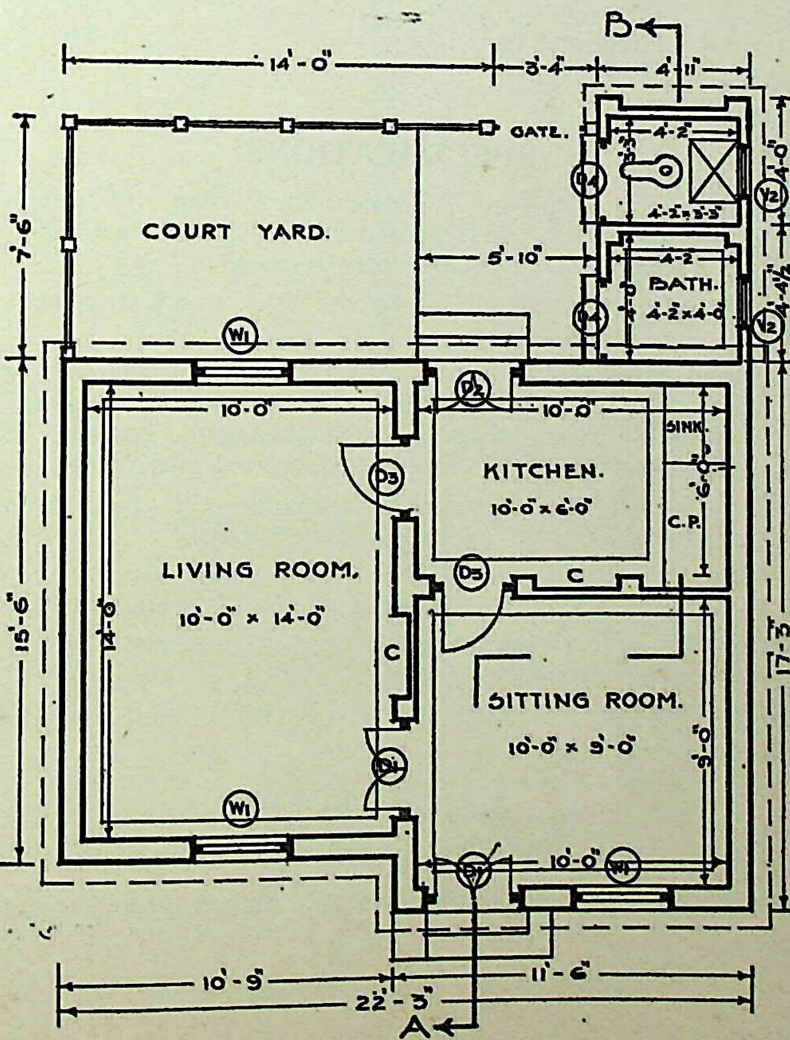
Special Features

1. Aqua Privy with no external service provision.

2. Height of roof slopes from 9′-4½″ to 9′-1½″.

3. Precast R.C.C. courtyard wall in between columns and flat brick paying for flooring in courtyard.





41 (A).—GOVERNMENT OF BOMBAY—HOUSING BOARD.

42

This compact and semi-detached two-roomed house has been designed and constructed by the Government of Bihar. It uses traditional materials and traditional methods of construction.

DATA

1. Floor area . . . . 367 s. ft.
2. Plinth area . . . . 476 „
3. Cost at Bihar / „ Delhi Schedule } (Including Services) { 5000/-/- / 4940/-/-

	Bihar	Delhi
	Rs.	Rs.
4. Plinth area rate .	10/8/-	10/6/-
5. Floor area rate .	13/9/-	13/7/-

SPECIFICATIONS

Foundation and Plinth—1′-7½″ wide and 2′ deep. 9″ lime concrete 1:2:2 using brick ballast. 13½″ second class brickwork in C.M. 1:8 upto 1′-6″ above ground level. No damp proof course.

Superstructure—9″ walls of 2nd class brick work in cement mortar 1:8.

Doors and Windows—1″ thick ledged braced and battened softwood doors with country teakwood frames and iron fittings. Windows shutters will be 1½″ thick 1/3 glazed and 2/3 battened with country teakwood frames and iron fittings. 5/8″ dia. M.S. bars fixed in windows.

Roofing—4½″ R.C.C. slab with 4″ terracing over main rooms and 4″ R.C.C. slab with cement punning at other places.

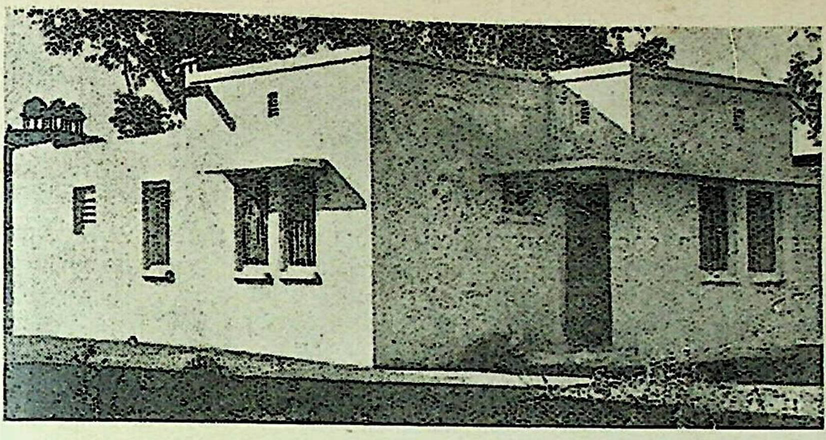
Finishing—½″ cement plaster 1 : 8 outside and inside and colour washed. Doors and windows painted with chocolate paint.

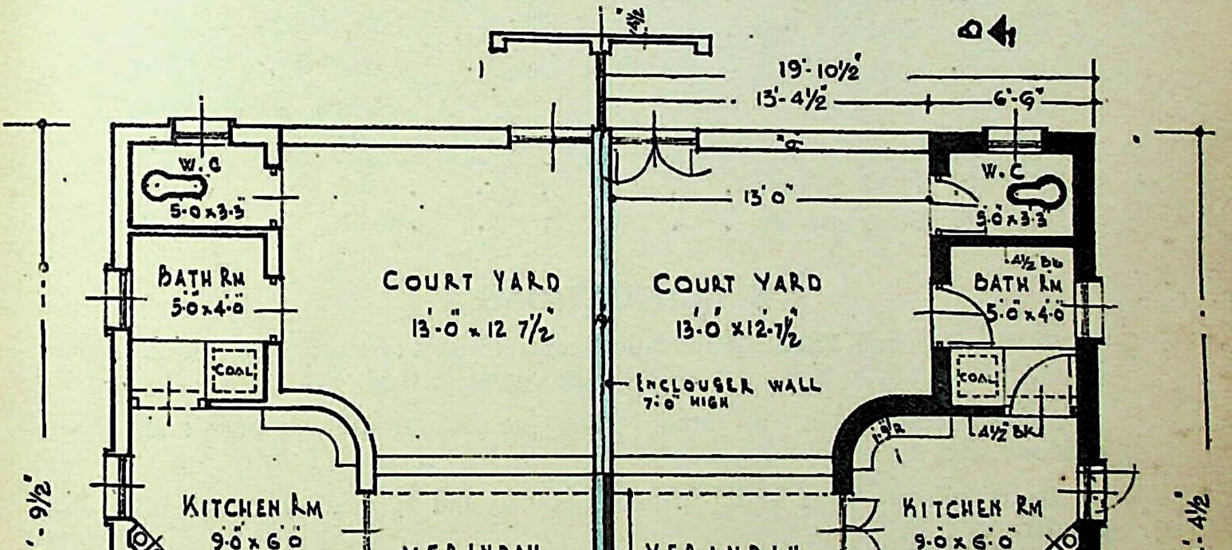
Flooring—1″ patent stone flooring (1 : 3 : 5) over 4″ dry rammed khoa. No flooring in courtyard.

Services—Sanitary and water supply one R.C.C. tank and electrical fittings.

Special Features

1. 1″ patent stone flooring 1:3:5 over 4″ dry rammed khoa.
2. R.C.C. slab without terracing over kitchen, verandah, bath and W.C.
3. Surface drains.





42.—GOVERNMENT OF BIHAR—P. W. D.

43

A house with a good compact design, put up by the Government of PEPSU. It uses mostly common building materials but the roof is precast.

DATA

1. Floor area . . . . 472 s. ft.
2. Plinth area . . . . 600 „
3. Cost at Patiala . . . . Rs. 4,302/-
4. Cost at Delhi . . . . Rs. 5,225/-

	Patiala Rs.	Delhi Rs.
5. Plinth area rate	7-3-0	8-10-4
6. Floor area rate	9-2-0	11-1-0

SPECIFICATIONS

Foundation and Plinth—Foundation concrete of 1:6:12 using brick aggregate. Plinth in B.B. in mud but edge course in C.M. 1:6.

Superstructure—B.B. in mud. The course around doors and windows and the two courses below ceiling in B.B. in C.M. 1:6.

Doors and Windows—Fully panelled doors and glazed windows in deodar wood.

Roofing—Precast tiles in cement concrete 1:2:4 with stone aggregate supported on precast R.C.C. 'I' shaped beams. On top of the concrete tiles 3″ of lime surkhi concrete with brick aggregate. (40% mortar). The whole shall be painted on top with a coat of asphalt and shall finally be covered over with 3″ of rammed earth to proper slope.

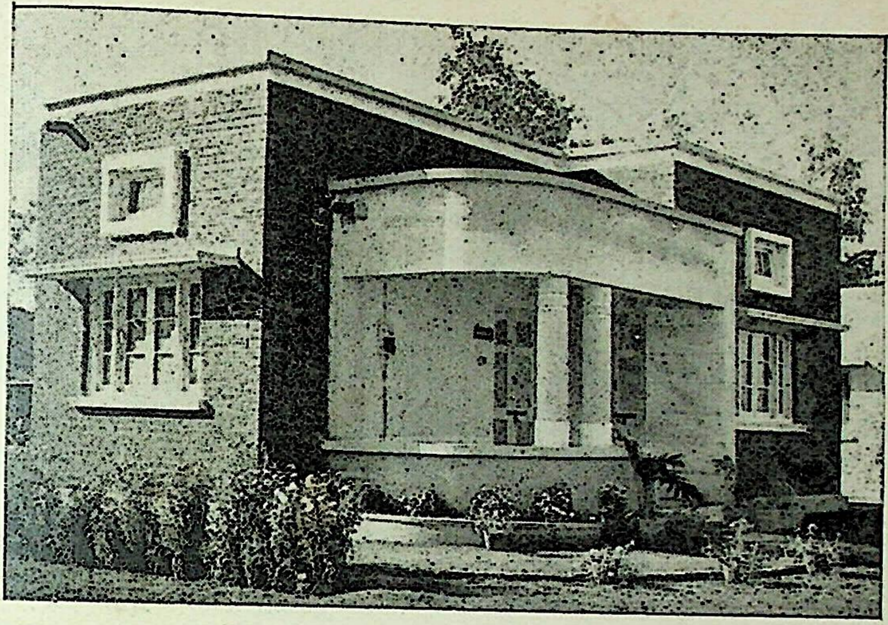
Finishing—Outside face of brickwall cement pointed. Woodwork painted and superstructure jibi faced using C.M. 1:4.

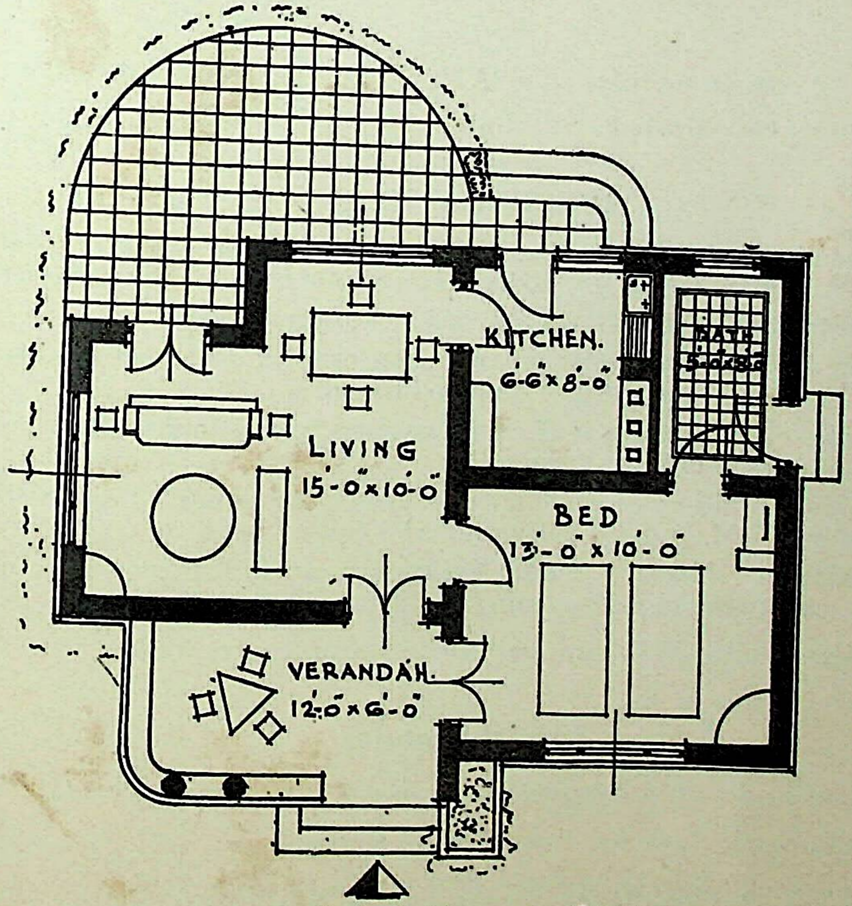
Flooring—1¼″ thick C.C. 1:2:4 laid in Panels over 3″ C.C. 1:6:12 using brick-ballast, which is over 4″ thick sand.

Services—One light point in each room and verandah and a light plug in the bed room. Wiring shall be of C.T.S. type on teakwood battens. One Indian type W.C., a tap in the bathroom and one tap in the kitchen.

Special Feature

Roof is of precast R.C.C. beam and tile of R.C.C. 1:2:4.





PLAN.

SCALE : 8 FEET = 1 INCH.

43.—GOVERNMENT OF P.E.P.S.U.—PATIALA.

44

A special feature of this house, erected by Asbestos Cement Company Limited, is a curved double roof. Asbestos Cement sheet, which is so curved, eliminates all timber work in the roof. Asbestos is a good building material and in this house its insulation properties have been improved by having two sheets with a layer of air in between.

DATA

1.	Floor area	354 s. ft.
2.	Plinth area	464 ,,
3.	Cost at Delhi	Rs. 3,955/-

		Delhi Rs.		
4.	Plinth area rate	8/8/-	per	s. ft.
5.	Floor area rate	11/2/10	,,	,,

SPECIFICATIONS

Foundation and Plinth—Foundations according to the nature of soil. The plinth height is kept at 18″ above G.L. and is of brick in cement mortar.

Superstructure—B.B. 14″, 9″, 4½″ walls in cement mortar.

Doors and Windows—Plain asbestos sheet panelled doors and windows with half louvers 3′ long fitted to teakwood frames.

Roofing—The main hut is of curved asbestos cement sheets. Bath and W.C. with asbestos cement sloping roof.

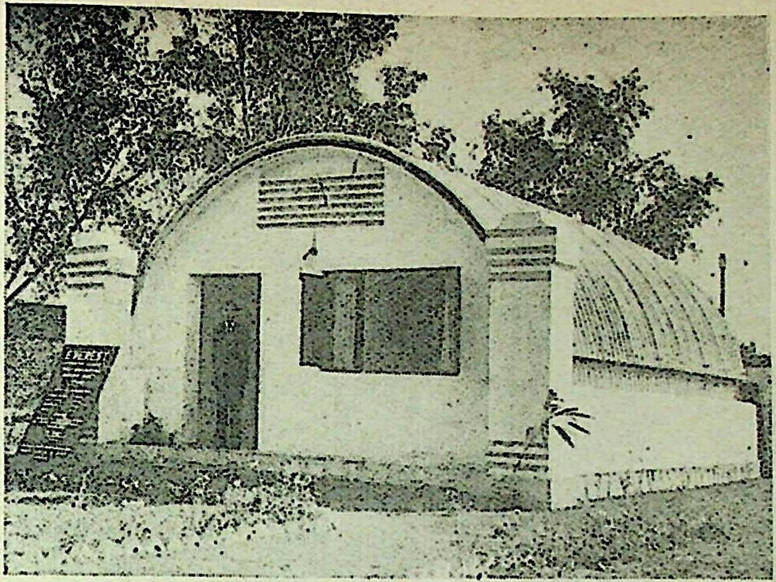
Finishing—Walls up to plinth level pointed on the outside. Inside walls plastered with C.M. 1 : 4 and colour-washed 3 coats.

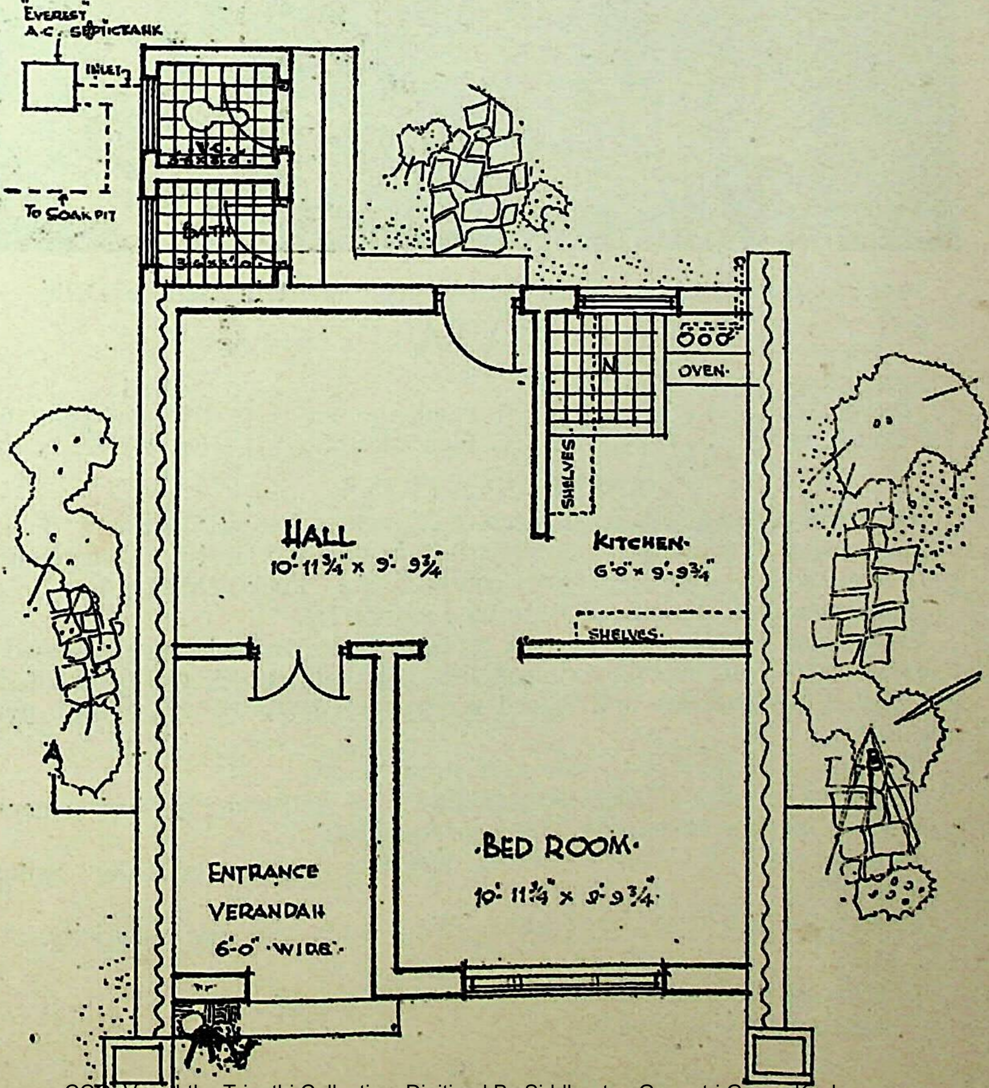
Flooring—1″ thick 1 : 4 cement mortar over 1 : 3 : 6 concrete and rubble packing and finished smooth.

Services—Indian W.C. pan and asbestos cement septic tank.

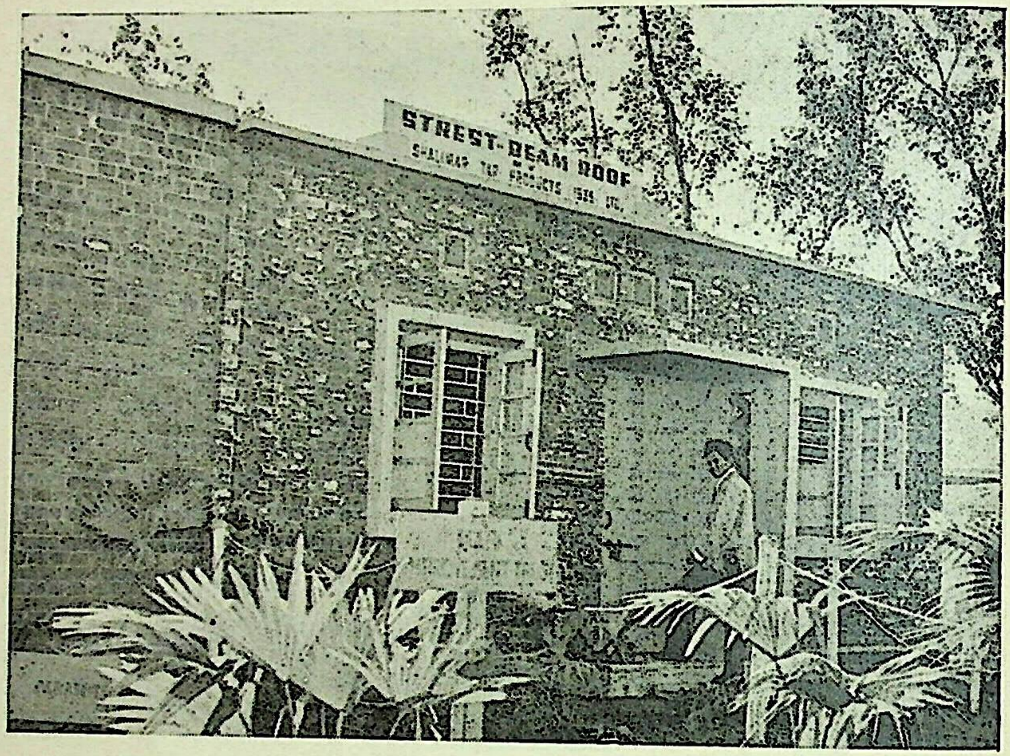
Special Features

1. Roof is of curved Asbestos cement over a clear span of 17′—4½″.
2. A.C. Septic Tank for disposal of the sewage.
3. Doors and windows are of A.C. panels and louvres.





44.—ASBESTOS CEMENT COMPANY, LTD.



Another good house put up by the Military Engineering Service, Delhi.

DATA

1. Floor area	. 446 s. ft.		Delhi
2. Plinth area	. 591 s. ft.	4. Plinth area rate	Rs. 8/7/0 per s. ft
3. Cost at Delhi	. Rs. 4,995/-	5. Floor area rate	Rs. 11/3/0 ,, s. ft.

SPECIFICATIONS

Foundation and Plinth—3′-0″ deep, 2′-0″ wide. Cement concrete 1 : 4 : 8, 6″ thick using stone ballast. 1st class B.B. in lime mortar 1:3. The plinth 1′-0″ above G.L. The damp proof course is of ¾″ thick C.M. 1 : 3.

Superstructure—1st class B.B. in lime mortar 1:3.

Doors and Windows—Following types of doors and windows are used. 1. Deodar (1) panelled, (2) half panelled, and half glazed, (3) fly proofed and glazed, (4) battened and braced windows, Glazed 1¼″ thick with fly-proofing.

Roofing—Precast R.C.C. slab over strest beams.

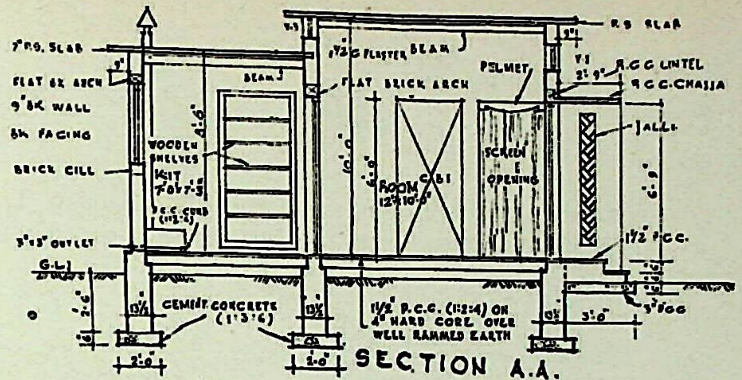
Finishing—Inside ½″ thick cement plaster 1:3 and white washed cement pointing to brick-work outside, Woodwork painted.

Flooring—1½″ C.C. 1:2:4 flooring over bed of lime concrete using brick ballast.

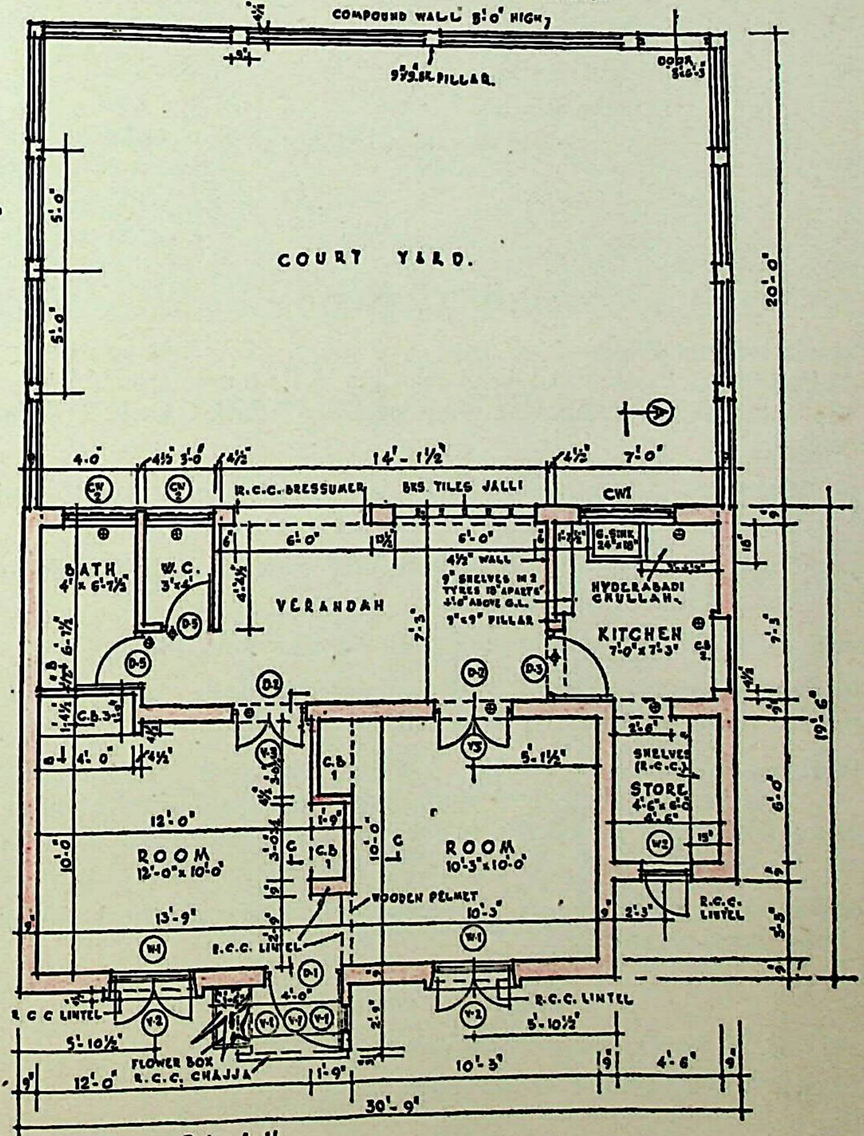
Services—Flush type glazed Indian W.C., water taps and electricity.

Special Features

1. Low kitchen and verandah, R.C.C. sloping roof.
2. Adequate storage space.



SECTION A.A.



PLAN
SCALE-1/8"=1'-0"

45—MILITARY ENGINEERING SERVICE

46

This house designed and constructed by Delhi Improvement Trust, is based on traditional methods of construction but the roof uses both RCC and brick-pieces.

DATA

1.	Floor area		430 s. ft.
2.	Plinth area		538 „
3.	Cost as per Trust		Rs. 4,525/-
	„ „ Delhi Schedule		Rs. 4,661/-
		Trust rate at Delhi	Delhi Schedule including the cost of services.
4.	Plinth area rate	Rs. 8/6/-	Rs. 8/10/- sq. ft.
5.	Floor area rate	„ 10/9/-	„ 10/13/- sq. ft.

SPECIFICATIONS

Foundation and Plinth—2′-3″ wide × 3′ deep. 1 : 3 lime concrete with brick ballast 9″ thick: 18″ thick brick masonry in 1 : 6 upto ground level and then 13½″ upto plinth, 9″ above ground level. 1″ thick C.C. 1 : 2 : 4 damp proof course.

Superstructure—II class brickwork in 1 : 6 cement mortar and 9″ lintels of flat brick arches.

Doors and Windows—1¾″ thick softwood battened and braced doors and windows, with iron fittings.

Roofing—R.C.C. T. beam roofing with 1st class brick filling.

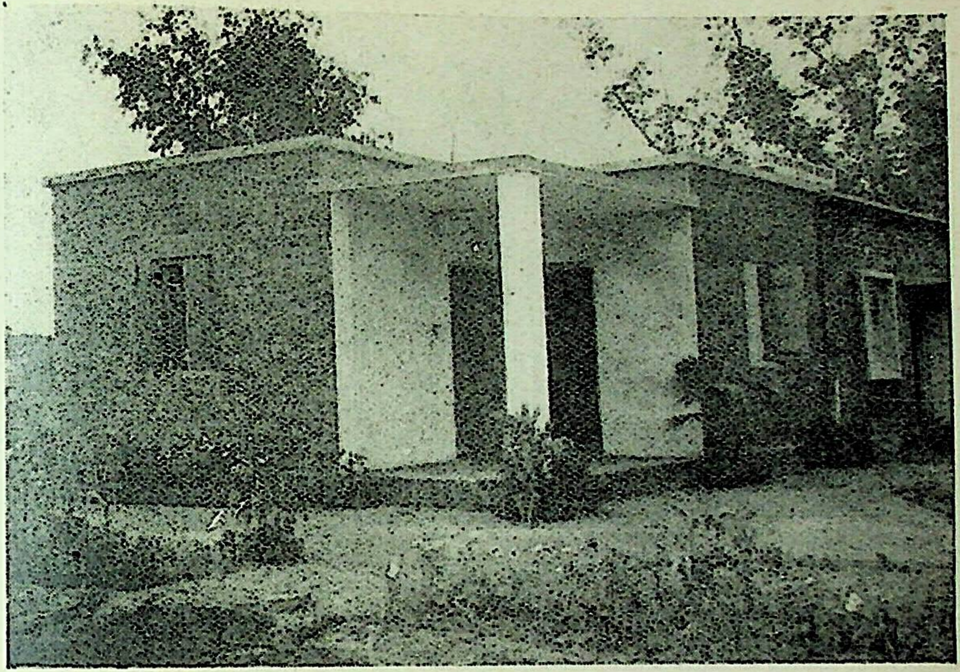
Finishing—Cement pointing 1 : 2 to outside walls and ¾″ mud plaster with white washing to inside walls.

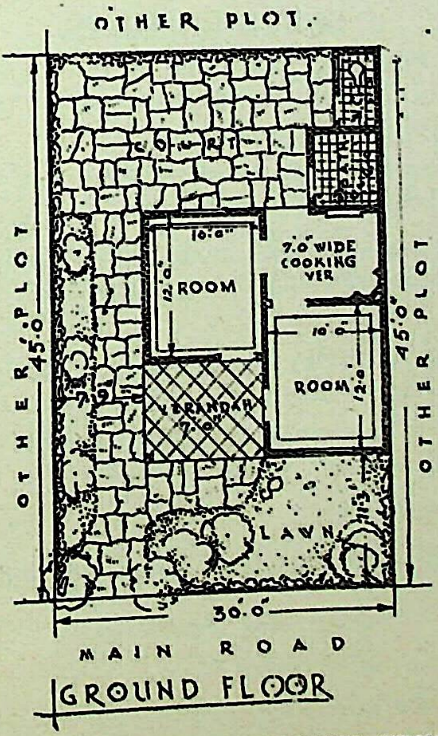
Flooring—First class flat brick flooring with 1 : 2 cement pointing over 3″ thick lime concrete 1 : 3 using brick bats laid over 2″ layer of Jumna sand has been provided. In the open courtyard only flat brick flooring has been provided.

Services—Complete sanitary, water-supply and electrical arrangements have been provided.

Special Features

1. R.C.C. T. beam roof with 1st class bricks filling.
2. Brick flooring with lime pointing.





46.—DELHI IMPROVEMENT TRUST.

47

A non-traditional house, constructed by the Rational Planning Corporation, Ltd., which can be built by a family working on it. The 8″ cavity wall uses a much lower number of bricks and gives very good insulation. Cement concrete blocks, 16″ × 8″ × 2½″, have been used. Roof and the floor are also novel types.

DATA

		Bombay	Delhi	
1.	Floor area	271 s. ft.		
2.	Plinth area	336 s. ft.		
3.	Cost at Bombay	Rs. 3,796/-/-		
	Cost at Delhi	Rs. 3,540/-/-		
4.	Plinth area rate	Rs. 11/5/-	10/9/-	sq. ft.
5.	Carpet area rate	„ 14/0/-	13/1/-	„

SPECIFICATIONS

Foundation and Plinth—2′ wide and depth as required, say 2½′, 9″ concrete 1 : 4 : 8 and 15″ burnt bricks in cement mortar 1 : 8 upto 1′ above ground level. No damp proof course.

Superstructure—Solid cement concrete blocks of 16″ × 8″ × 2½″ and 8″ × 8″ × 2½″ to be laid to make a hollow wall 8″ thick.

Doors and Windows—1½″ thick country teak wood panelled doors with 4″ × 2″ country teak wood frames. with black sheet standard panels and iron fittings.

Roofing—Hollow burnt clay bricks with reinforcement and laid flat with Indian patent stone on top.

Finishing—Cement pointing on outside, and inside with colour washing. Doors and windows will be painted.

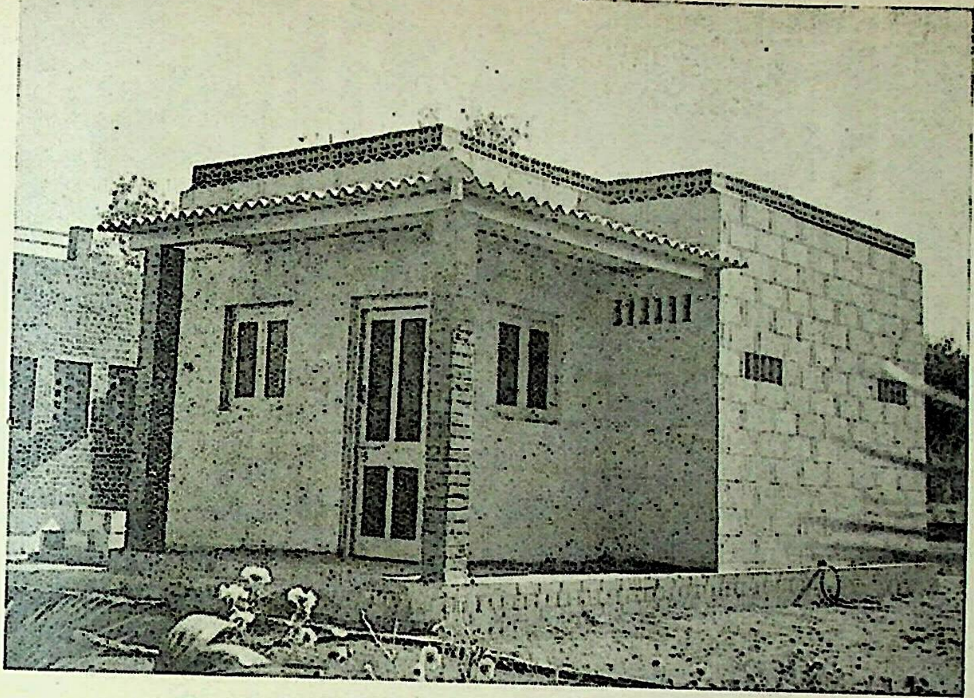
Flooring—Stabilised soil.

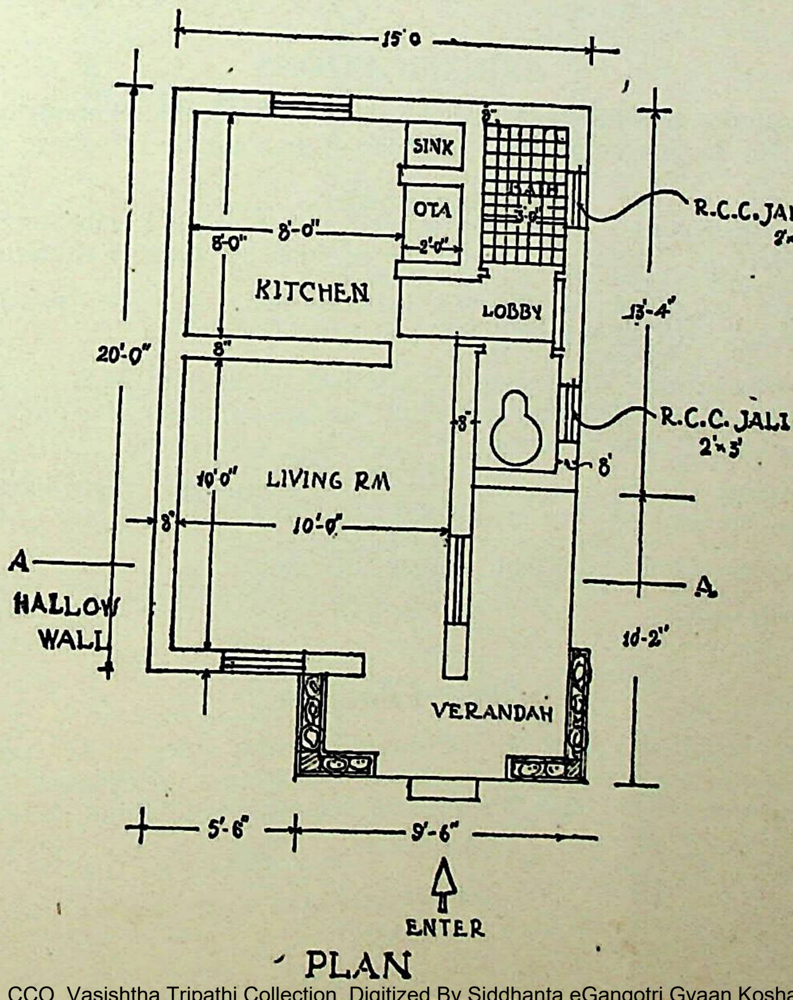
Services—One WC with drainage, Water supply and electricity.

Special Features

1. Hollow walls with solid clinker block.

2. Roof with reinforced hollow burnt clay bricks and laid flat with Indian patent stones on top (This does not require any centering). (Hollow bricks manufactured by The Standard Tile and Clay Factory, Feroka).





PLAN

47.—THE RATIONAL PLANNING CORPORATION HOLLOW WALLS.

48

Kotah stone is a high class building material. It is so called because it is found in the old Kotah State (now part of Rajasthan) in a variety of colours. After mining, it is polished and becomes thereby very good flooring material. It has very good wearing qualities.

DATA

1. Floor area	224 s. ft.		
2. Plinth area	309 s. ft.		
3. Cost at Kotah	Rs. 2,850/-/-		
Cost at Delhi rate . . .	Rs. 3,200/-/-		
(Excluding cost of services) .		Kotah	Delhi
4. Plinth area rate		Rs. 9/4/-	Rs. 10/6/- s. ft.
5. Floor area rate		Rs. 12/11/-	Rs. 14/5/- s. ft.

SPECIFICATIONS

Foundation and Plinth—9″ thick 1 : 4 : 8 C. Concrete. Foundation 18″ thick. No damp proof course. B. Brick in mud mortar 12″ above ground level.

Superstructure—9″ thick B.B. in mud mortar rough Kotah Stone dado for inside upto 3′ height. Some of the partition walls are of Kotah stone.

Doors and Windows—Country teakwood with masonite panels with iron fittings. R.C.C. jallis for WC and Bath windows.

Roofing—Kotah stone slabs set and laid on inverted M.S.-T. sections. The joints will be filled with cement or bitumen and made leak-proof. Top covered with 4″ lime concrete.

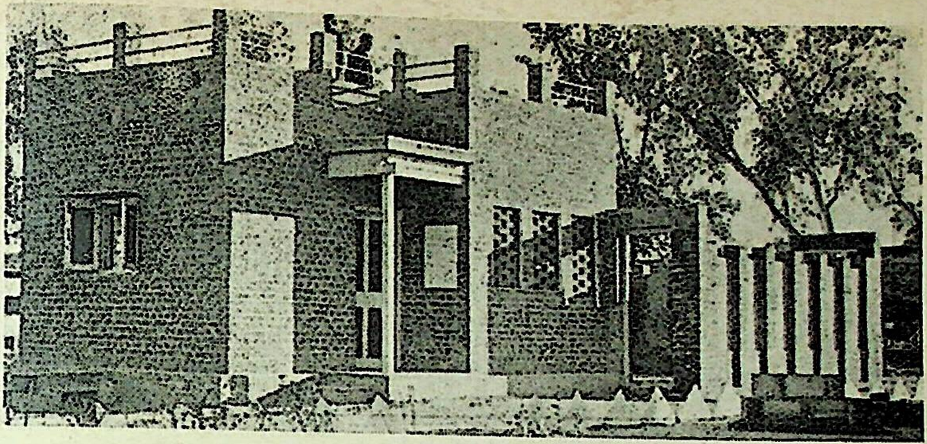
Finishing—Cement pointing and colour-washing. The doors and windows are painted.

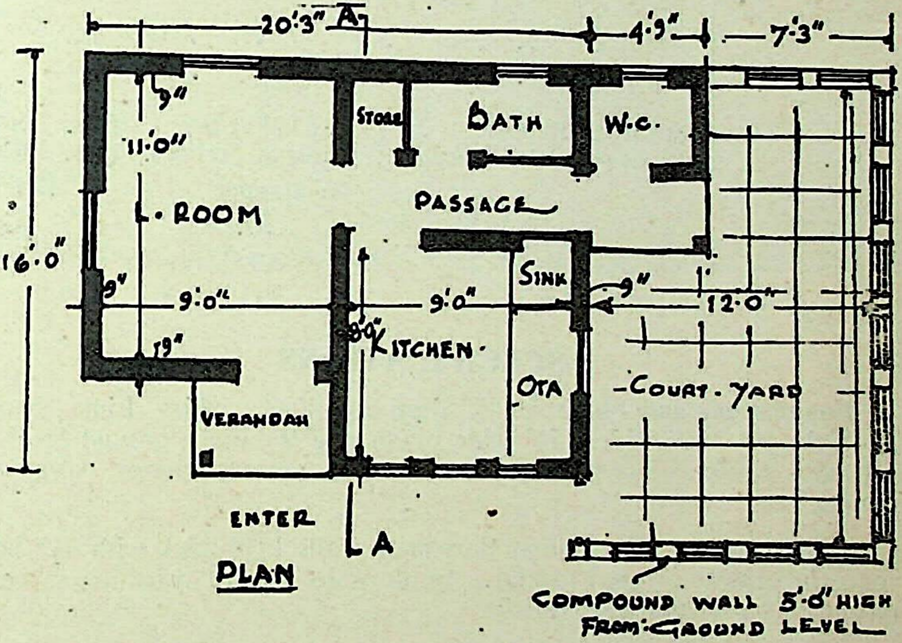
Floorings—Polished Kotah stone 1′ × 1′ tiles.

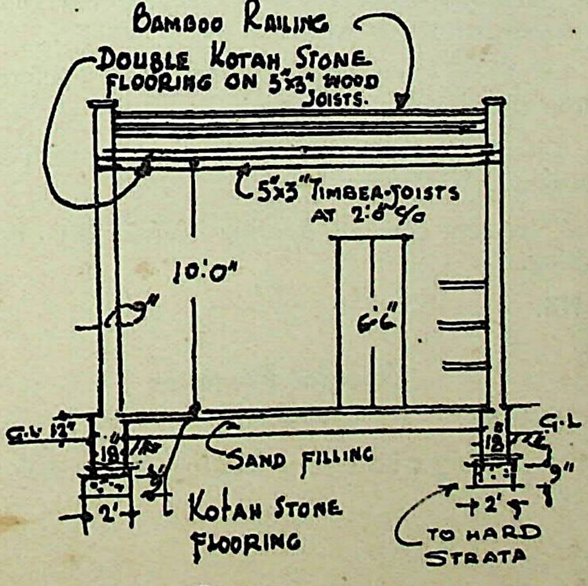
Services—Nil.

Special Features

The house is built to illustrate various uses of laminated Kotah stone which can be quarried in different thicknesses and is claimed to be cheaper than a traditional house within 20 miles radius of the quarry.







SECTION AT AA

48.—THE RATIONAL PLANNING CORPORATION—KOTAH STONE

49-50

S. Mehta of Saharanpur has put up one roomed house using traditional materials, but the method of construction is slightly different. The hollow walls, provide better insulation. It is also the claim of the builder that the adoption of a uniform span of 10′ has resulted in considerable reduction in the amount of timber used in the roof.

DATA

1. Floor area . . . . 321 s. ft.
2. Plinth area . . . . 429 „
3. Cost at Saharanpur . } Excluding the Cost of Services. Rs. 2,500/-
   Cost as per Delhi Schedule } Rs. 3,020/-

		Saharanpur Rs.	Delhi Rs.
4.	Plinth area rate .	5/13/- sq. ft.	7/1/- sq. ft
5.	Floor area rate .	7/13/- sq. ft.	9/7/- sq. ft.

SPECIFICATIONS

Foundations and Plinth—2′-6″ deep and 2′-6″ wide. Lime concrete 1′ thick and 2′-6″ wide. $1\frac{1}{2}$′ wide plinth and 9″ above ground level with 1st class bricks in cement mortar. $\frac{3}{4}$ thick cement mortar damp proof course.

Superstructure—Cavity first class brick walls $13\frac{1}{2}$″ thick with $4\frac{1}{2}$″ hollow space in cement or mud mortar. Inside walls are $4\frac{1}{2}$″ partition in cement mortar 1:6 with first class bricks.

Doors and Windows—Battened doors and glazed windows. Louvre have been provided below windows and above doors.

Roofing—A.C. Sheet sloping roof with three different slopes over wooden purlins. Hard board ceiling.

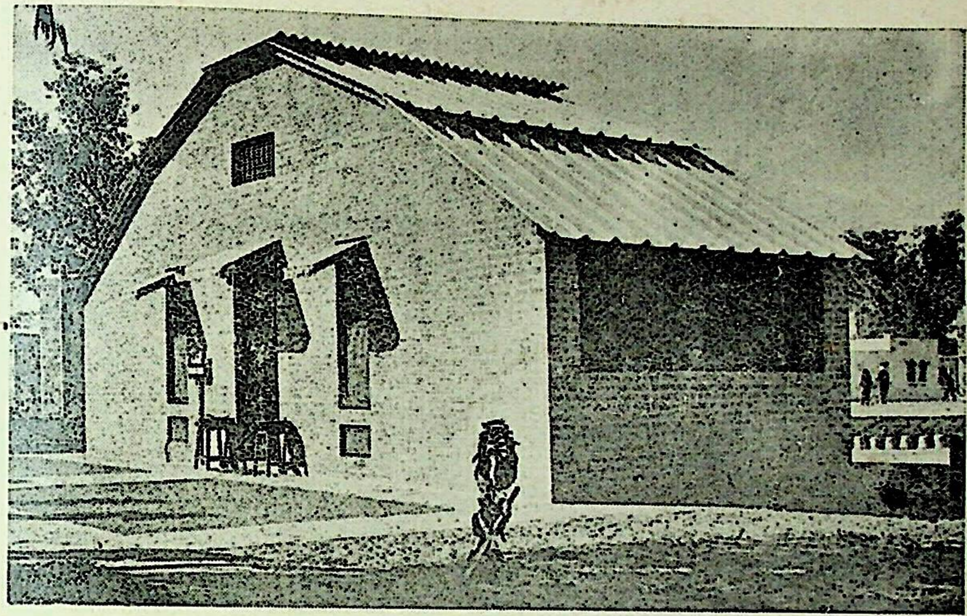
Finishing—Lime pointing inside and outside with white or colour washing. Doors and windows painted.

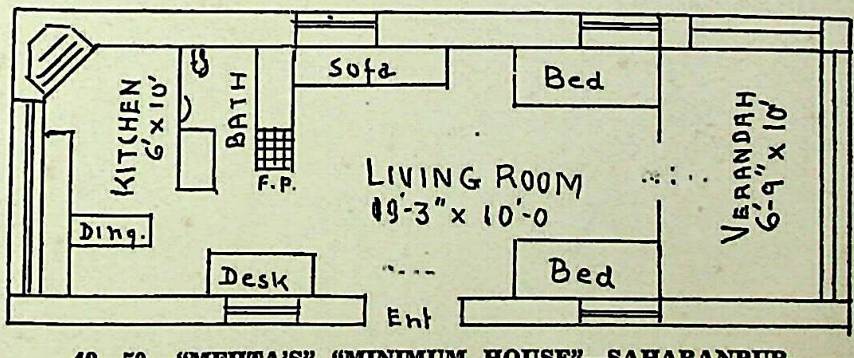
Flooring—1″ cement concrete flooring over 3″ dry brick ballast and 5″ of sand filling.

Services—Nil.

Special Features

1. Cavity brick walls in superstructure.
2. A.C. Sheet roofing with ceiling making an airspace for insulation.





49—50.—"MEHTA'S" "MINIMUM HOUSE"—SAHARANPUR.

51

A good well arranged design suitable for urban areas. It is built of stone—an important building material found in many parts of India. The utilisation of stone makes the house particularly well protected from being affected by moisture and dampness.

DATA

1. Floor area . . . . . 509 s. ft.
2. Plinth area . . . . 687 s. ft.
3. Cost at Rajasthan Jaipur Rs. 4,981/-/- } Including the cost
   Cost as per Delhi schedule Rs. 7,720/-/- } of services.
   of rates.

		Jaipur	Delhi
4.	Plinth area rate . . .	Rs. 7/4/- sq.ft.	Rs. 11/3/4 sq.ft.
5.	Floor area rate . . .	„ 9/12/6 „	„ 15/2/8 „

SPECIFICATIONS

Foundation and Plinth—Necessary excavation depending on the nature of the soil. Lime concrete in stone ballast using 40 per cent. lime mortar. Plinth and foundations in Random rubble masonry in lime. Height of plinth 1′-0″ above ground level.

Superstructure—Random rubble in lime for walls. Coursed rubble in lime for pillars. Stone lintels.

Doors and Windows—C.P. teak wood. 1″ thick battened doors. 1″ thick shutters, iron fittings for windows. 1″ with cement jali for openings. 3″ × 4″ R.C.C. frames.

Roofing—10″ to 12″ thick Jodhpur stone slab roofing with Dar, Kharanja. Cement concrete jointing and white-washing on ceiling. For WC etc. the roof is of Kotah stone slab roofing and finished as above. Dab stone over chajja.

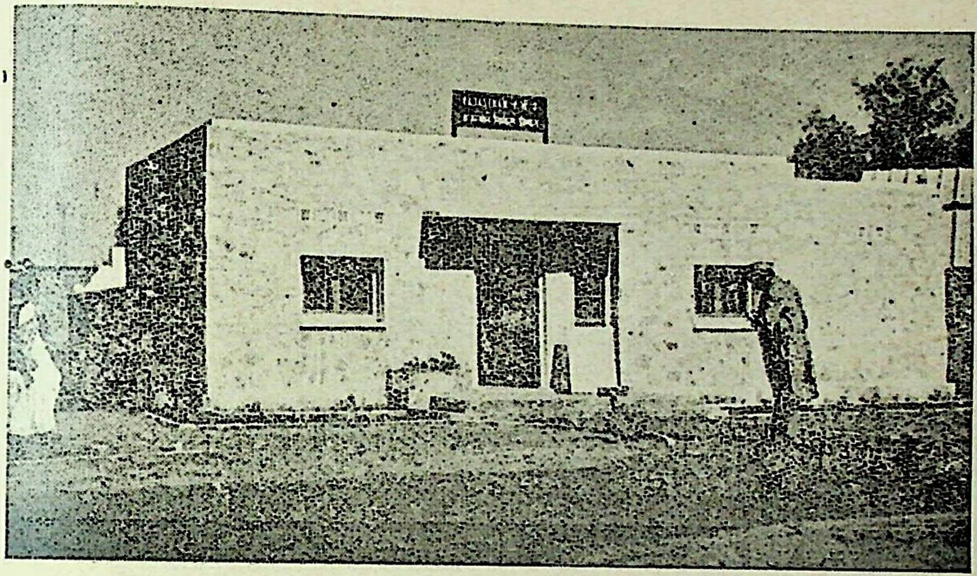
Finishing—Inside lime plastered 1 : 3 coats. Out-side lime pointed. Wood work Painted.

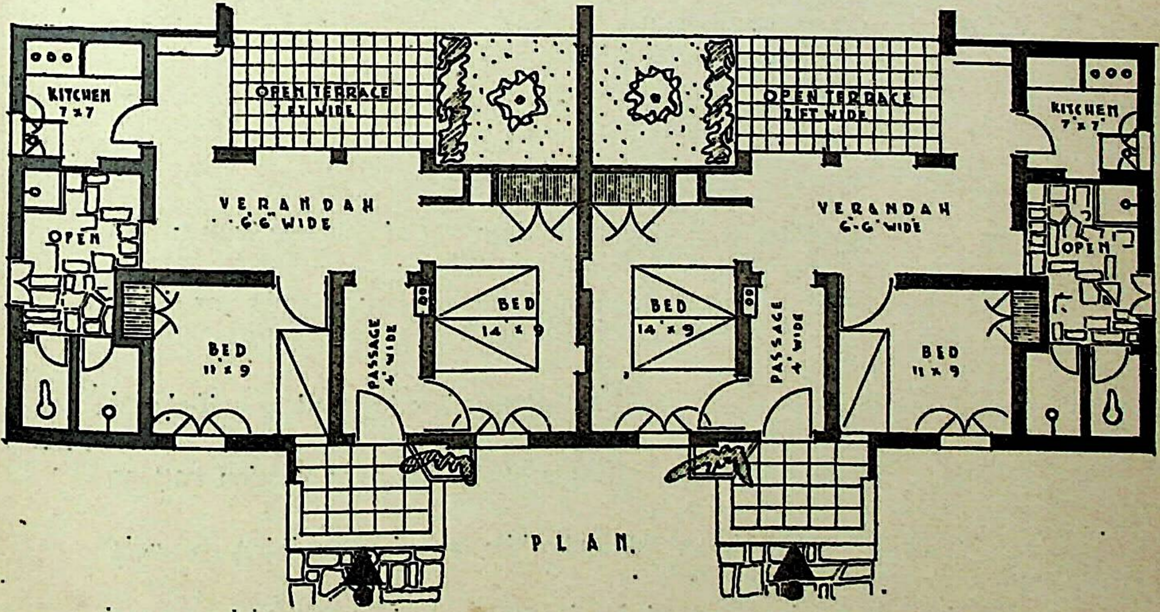
Flooring—1½″ cement concrete floor over 3″ lime concrete in 1:3:6 and finished neatly.

Services—Electric fittings, sanitary installations and water-supply.

Special Features

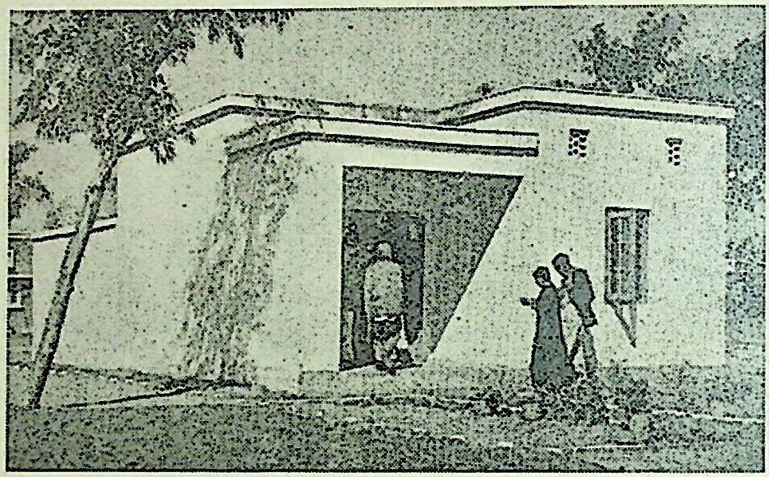
1. Stone roofs and chajjas.
2. Superstructure in stone masonry.
3. The cost includes the cost of a wall for the Courtyard.





51.—GOVERNMENT OF RAJASTHAN.

52



This is a house put up by the Sindri Fertilizer Factory Limited generally on traditional lines.

DATA

1. Floor area . . . . . 426 s. ft.
2. Plinth area . . . . . 532 s. ft.
3. Cost at Delhi (Excluding the cost services but including the cost of electricity) . . . . Rs. 3,240/-/-
4. Plinth area rate . . . . Rs. 6/1/- s. ft.
5. Floor area rate . . . . Rs. 7/10/- s. ft.

SPECIFICATIONS

Foundation and Plinth—2′ wide, 2′-0″ deep. Mud concrete with bricks bats 2nd class brick work in CM 1 : 8, 1″ thick C.C. 1 : 2 : 4 D.P.C.

Superstructure—2nd class B.B. in mud mortar, except jambs for doors and windows. 4½″ thick brick work in C.M. 1 : 6 in partitions. Brick arches over openings.

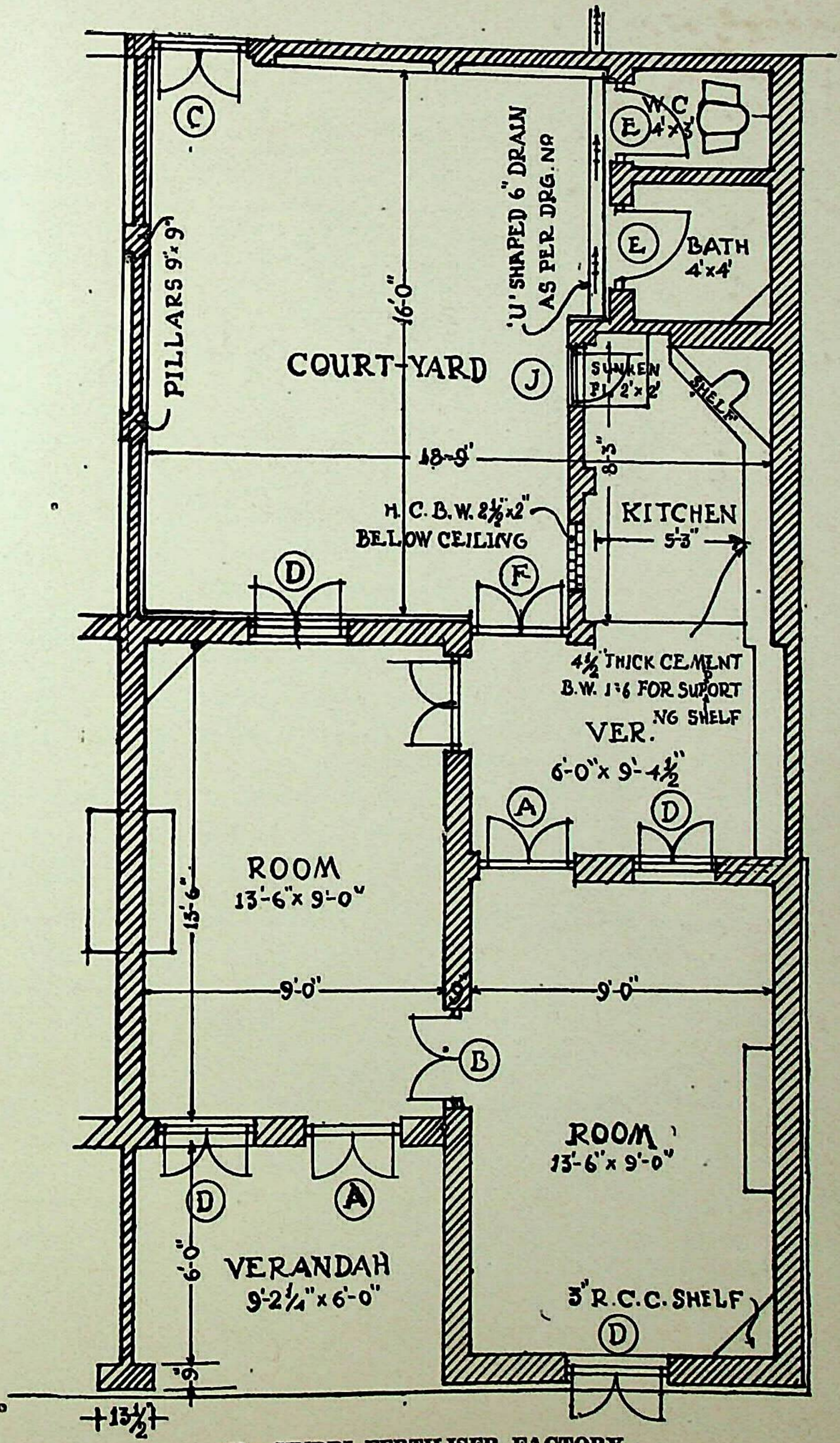
Doors and Windows—Soft wood 1¾″ battened and braced or half-glazed and half panelled doors. Fully glazed windows.

Roofing—Sloping 1½″ thick red Agra stone slab over wooden battens. Top finished with mud phuska.

Finishing—½″ C.M. plaster 1:6 and white or colour washing to walls. Doors and windows are painted.

Flooring—1″ thick C.C. 1:2:4 flooring over a bed of 1½″ thick rammed brick ballast.

Services—No provision water supply and drainage connection.



52—SINDRI FERTILISER FACTORY

53

In the use of concrete, the application of water has to be based on a judicious compromise between strength and workability. "Vacuum concrete" claims to increase workability by using as much water as necessary. After the concrete is poured in, optimum water-cement ratio is ensured by the removal of excess water with a portable mechanical device. This is, therefore, a new type of house using a new technique.

DATA

1. Floor area . . . . . . 465 s. ft.
2. Plinth area . . . . . 497 s. ft.
3. Cost at Delhi (including services) . Rs. 3,880/-/-
4. Plinth area rate . . . . . Rs. 7/13/- s. ft.
5. Floor area rate . . . . Rs. 8/5/- s. ft.

(Cost as given by the Firm.)

SPECIFICATIONS

Foundation and Plinth—10″ wide 1′-7″ deep. Lime concrete using 1 lime: 6 surki: 10 bricks bats. Cement Concrete plinth 9″ high.

Superstructure—Precast R.C. walls of vacuum concrete.

Doors and Windows—C.P. teak wood doors with wooden frames and C.P. teak windows with concrete frames.

Roofing—Precast concrete shell roof with mastic joints using the vacuum concrete process.

Finishing—Painting to wood work, white washing inside colour washing outside rooms.

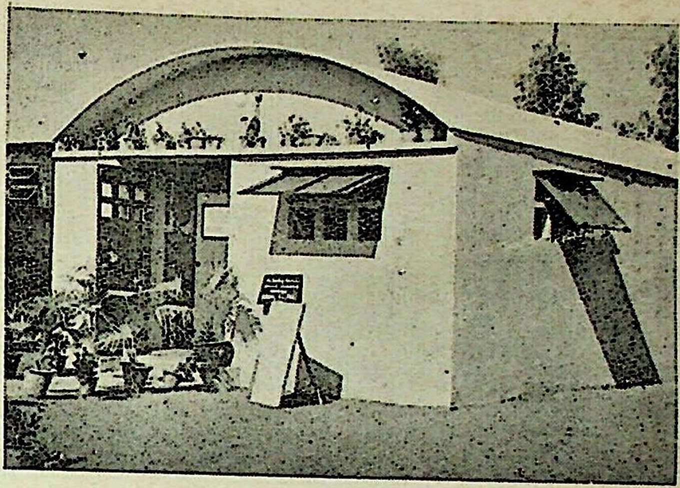
Flooring—1½″ cement concrete floated to smooth finish over a bed of 1½″ Line Concrete.

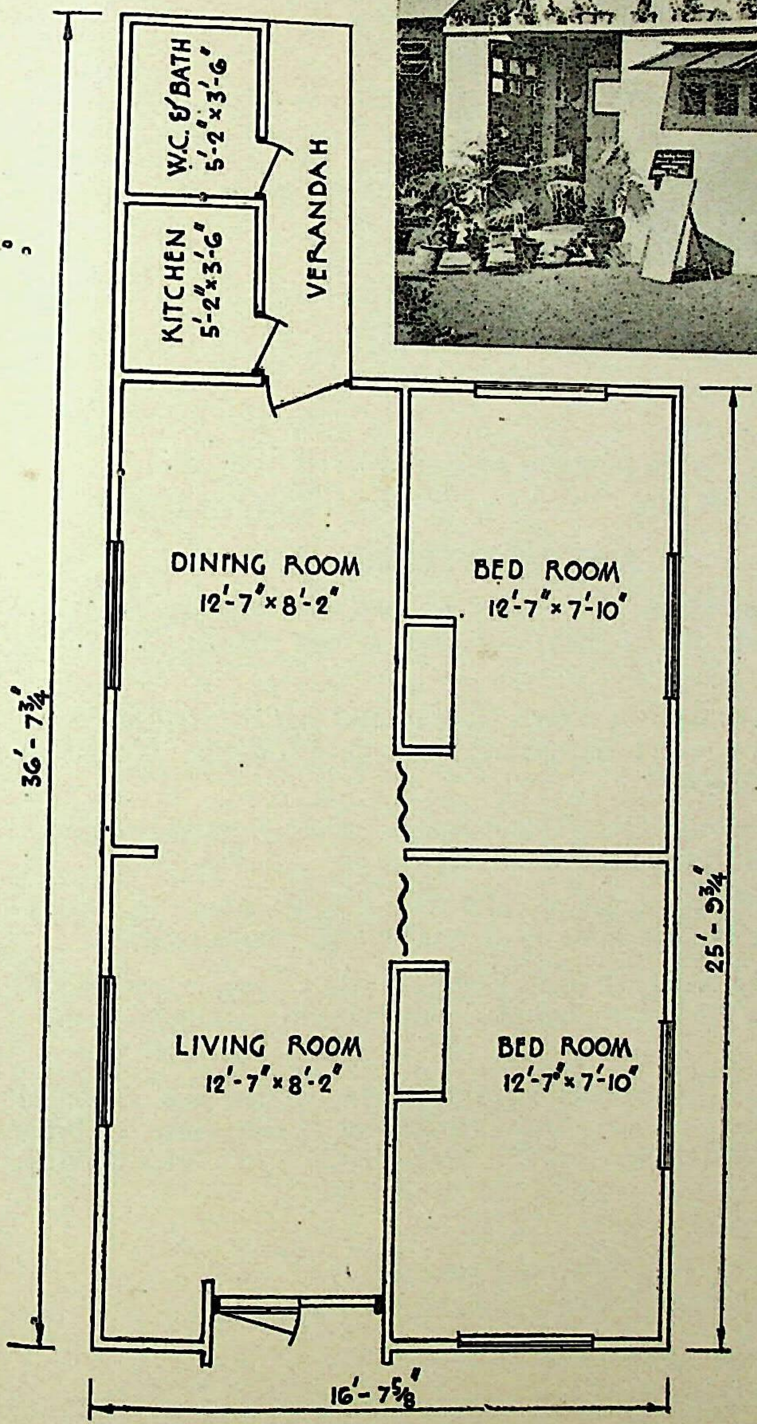
Services—Indian pattern W.C. with flushing arrangement, showers, water taps and electric lighting.

Special Features

The walls and roof are constructed with vacuum concrete process. Light mobile plant is used for prefabricating the sections of the house at site.

The process stabilises the fresh concrete within a few minutes of pouring, thus making it possible to cast the panels on top of one another in stacks and thus reducing casting area required. It is claimed that the strength of the concrete increases by the extraction of surplus moisture. The tools and plant used are (1) concrete mixer. (2) Vacuum Pump. (3) Mobile crane. (4) Processing mats. (5) Vacuum lifter.





PLAN

53.—MILLARS MACHINERY—BIRD & CO., VACUUM CONCRETE HOUSE.

54

This is a house designed by the Hindustan Housing Factory Limited for rural areas. The roof incorporates two modern methods of using concrete. The beams are made of prestressed concrete and the panels in the roof are of foam concrete. The doors and windows are all factory-made according to standard designs.

DATA

1. Floor area . . . . . . 738 s. ft.
2. Plinth area . . . . . 891 s. ft.
3. Cost at Delhi . . . . . Rs. 4,300/-/-
4. Plinth area rate (excluding services) Rs. 4/13/- s. ft.
5. Floor area rate . . . . . Rs. 5/13/- s. ft.

SPECIFICATIONS

Foundation and Plinth—2′-0″ deep. 6″ thick mud concrete using 1½″ gauge brick ballast. Mixed class brick work in mud mortar. 1″ thick C.C. 1:2:4 D.P.C.

Superstructure—Mixed class brick work in mud mortar except jambs of doors and windows and two courses at plinth in CM 1:6. Prestressed cement concrete columns.

Doors and Windows—Factory manufactured deodar doors and windows. Batten and braced doors and glazed windows.

Roofing—Lightly reinforced 4″ thick foam concrete panels over prestressed concrete beams, and top covered with 3″ mud phuska plaster.

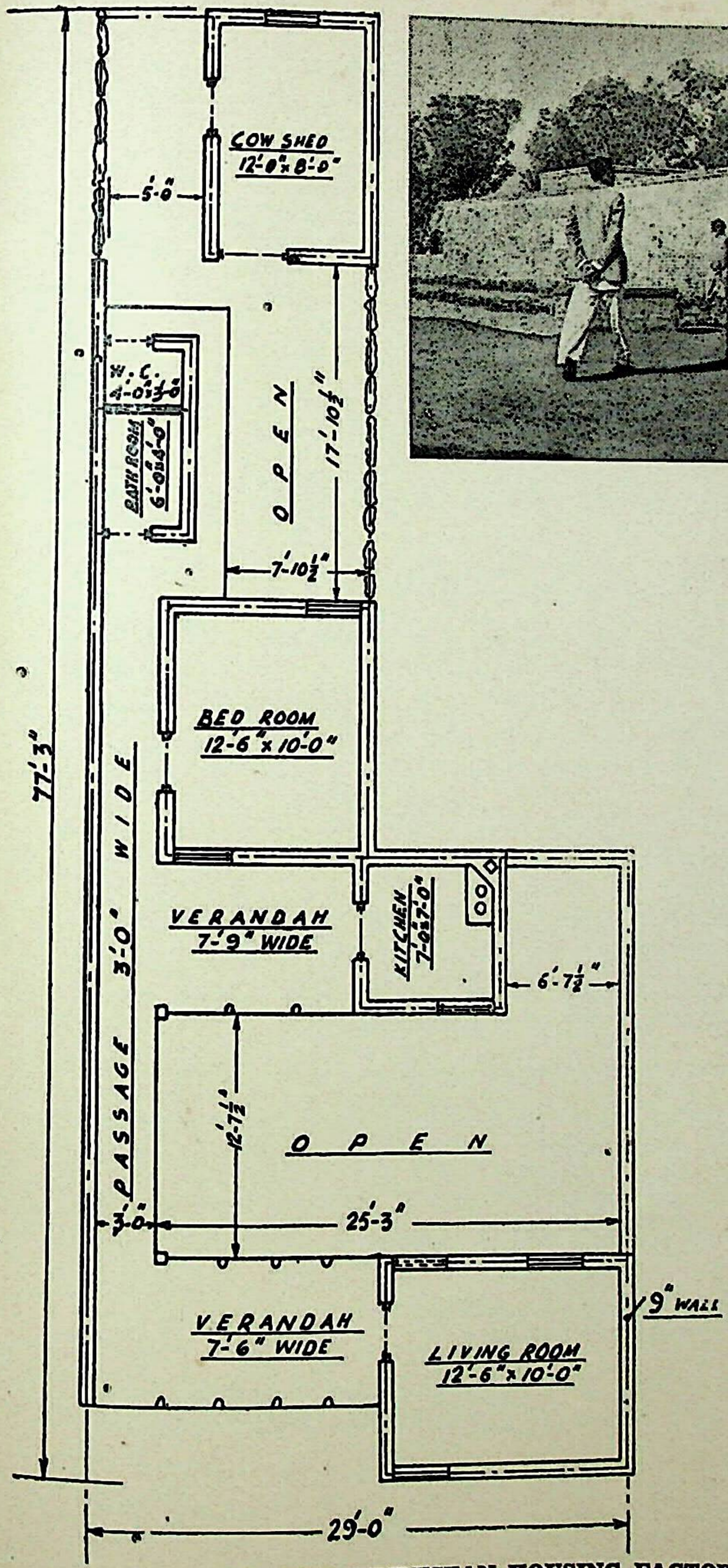
Finishing—Bath, verandah and passage ½″ thick cement plaster 1:6. Rooms, kitchen WC and cow shed etc., mud plastered. Outside—cement pointing 1:4.

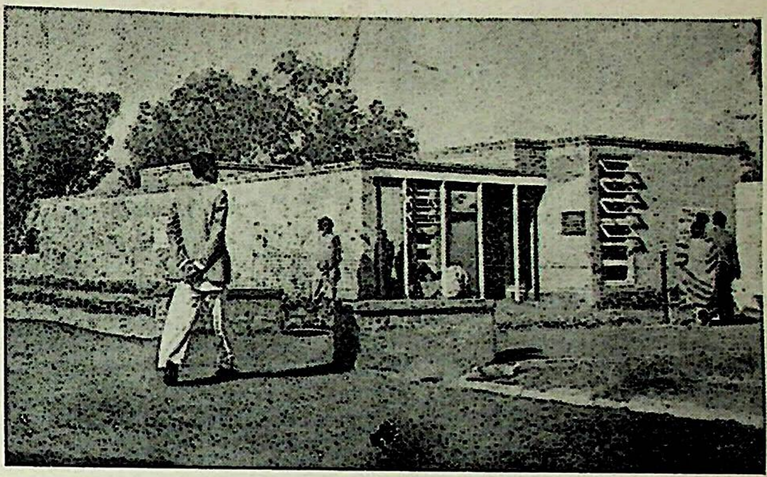
Flooring—1″ C.C. 1:2:4 flooring over 3″ lime concrete and 2″ jumna sand for all rooms except cow shed, verandah and passage where flat brick paving in cement mortar is provided. Open courtyard—dry brick flooring.

Services—Nil.

Special Features

1. Prestressed concrete beams and columns, saving in the size of section for these members.
2. Foam concrete panels for roof.
3. Factory made doors and windows.





54.—THE HINDUSTAN HOUSING FACTORY LTD., JANGPURA.

55

The interesting feature of this one-roomed house is the new type of material used for the roof and walls. Saw dust, wheat husk etc. have been synthesized into a board and it is claimed that this is water-tight as well as heat-proof.

DATA

		Bhavnagar	Delhi
1. Floor area	. . . .	220 (half bath & half W. C.)	
2. Plinth area	. . . .	255 s. ft.	
3. Cost at Bhavnagar / Cost at Delhi	(Excluding cost of services)	Rs. 1,588/-/-	Rs. 1,631/-/-
4. Plinth area rate	. . . .	6/3/6	6/4/- s. ft.
5. Floor area rate	. . . . . .	7/3/6	7/7/- s. ft.

[The costs given here have been supplied by the Exhibitor.]

SPECIFICATIONS

Foundation and Plinth—1′-0″ deep 1′-6″ wide with 1′-0″ deep lime concrete. Masonry in B.B. in lime mortar. No damp proof course.

Superstructure—4″ thick synthetic wood panels with bamboo reinforcement erected between 7″ × 7″ R.C.C. pillars all corners.

Doors and Windows—1¼″ thick shutters with synthetic wood panels.

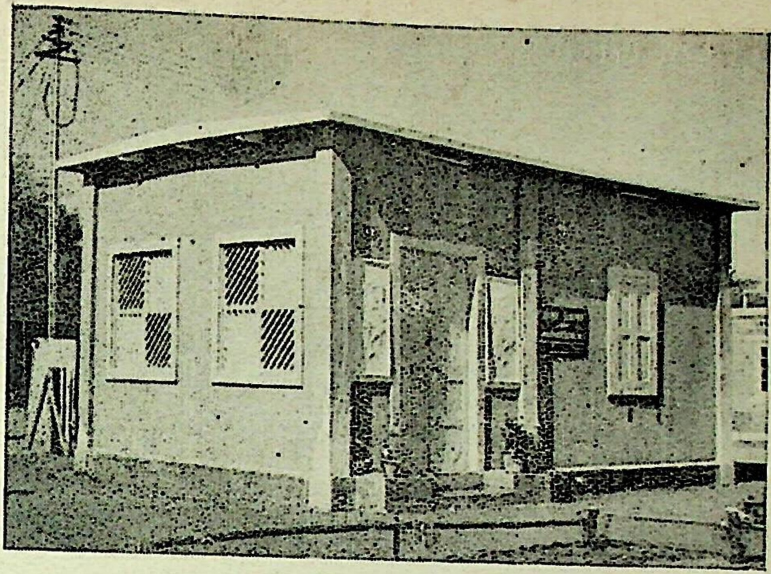
Roofing—1½″ thick synthetic wood panels with a bamboo reinforcements supported by 5″ × 3″ teak wood beams.

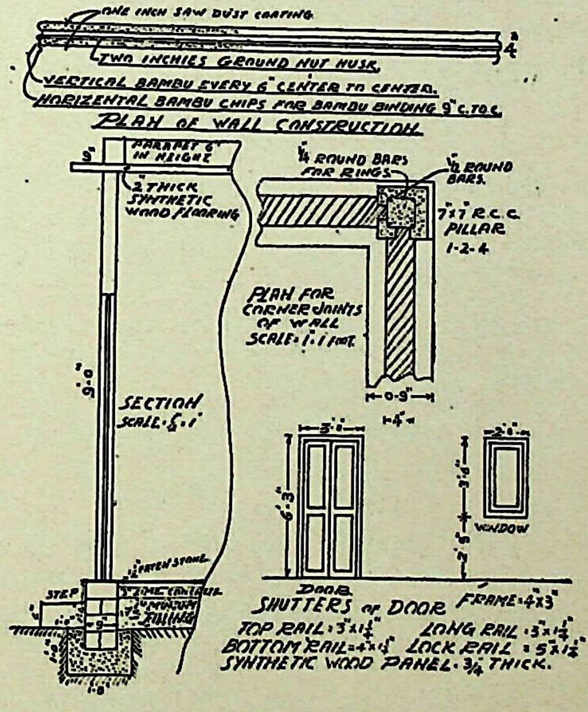
Finishing—Walls and woodwork painted.

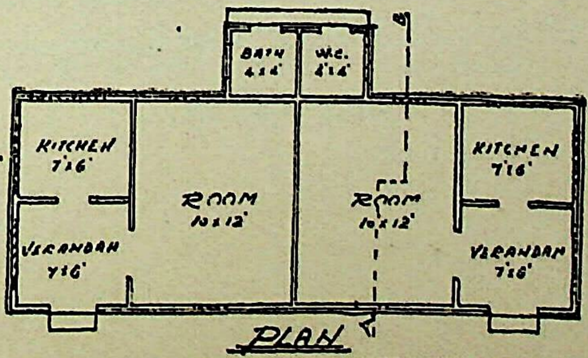
Flooring—1½″ C.C. 1 : 2 : 4 over a bed of 3″ lime concrete.

Special Feature

1. The roof, the walls and the doors and windows are of synthetic wood panels with bamboo as reinforcement. Synthetic wood is claimed to be fire and termite proof.







55—PITAMBER DOSABHAI PATEL—BHAVNAGAR.

56

This is a three-roomed house put up by the All India Housing Association. The construction is generally on traditional lines. The roof is of reinforced brick-work.

DATA

1. Floor area . . . . . 542 s. ft.
2. Plinth area . . . . 644 s. ft.
3. Cost at Delhi (including services) . Rs. 4,900/-/-
4. Plinth area rate . . . . Rs. 7/9/- s. ft.
5. Floor area rate . . . . Rs. 9/-/- s. ft.

SPECIFICATIONS

Foundation and Plinth—1′-6″ deep, 2′-0″ wide. 6″ thick (1 lime: 2 cinder: 7 Delhi quartzite stone) lime cinder concrete. Mixed class brick-work in line cinder mortar. Plinth 1′-0″ above ground level. 1″ thick C.C. 1:2:4 damp proof course.

Superstructure—Brick-work in 1:1:2 lime sand cinder mortar (mill mixed). Brick-work in mud mortar for inside walls 4½″ brick partition walls with hoop iron reinforcement.

Roofing—4½″ thick reinforced brick roof in C.M. 1:3. The ceiling is soft wood glazed windows. Iron fittings. 4″ square welded mesh to windows.

Roofing—4½″ thick reinforced brick roof in CM 1:3. The ceiling is plastered and 3″ thick mud phuska and gobri *leeping* over the roof.

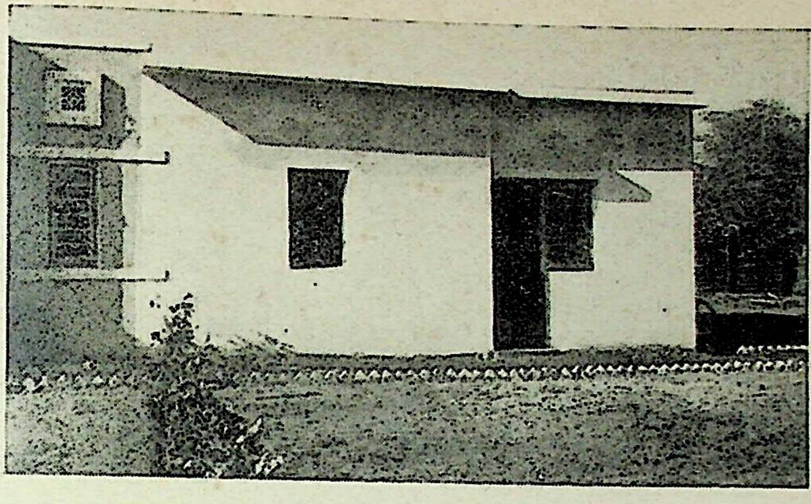
Finishing—½″ thick lime cement (1:1:8) plaster to outside and ¾″ thick stabilised mud plaster inside.

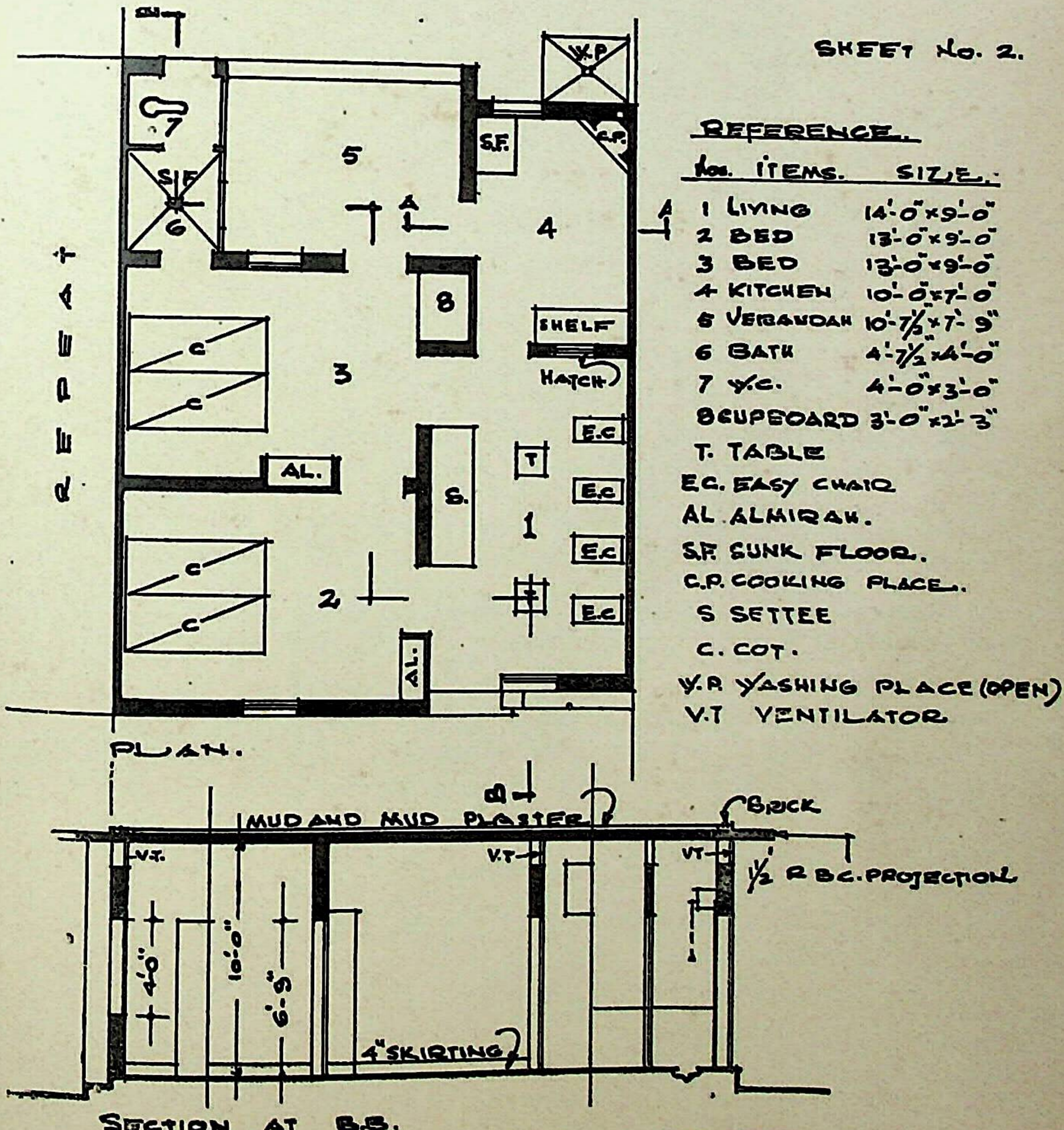
Flooring—1″ thick C.C. 1:2:4 over 3″ thick lime concrete.

Services—Indian pattern flush W.C., water taps and electricity.

Special Feature

1. Reinforced brick roof.





56.—ALL INDIA HOUSING ASSOCIATION.

57

This is another three-roomed house put up by the All India Housing Association. Instead of cement lime has been used.

DATA

1.	Floor area	580 s. ft.
2.	Plinth area	733 s. ft.
3.	Cost at Delhi	Rs. 5,000/-/-
4.	Plinth area rate	Rs. 6/13/- s. ft.
5.	Floor area rate	Rs. 8/10/- s. ft.

SPECIFICATIONS

Foundation and Plinth—2′-6″ deep and 2′-6″ wide. 1′-0″ thick lime concrete (1 lime: 1 cinder: 1 sand: 9 brick ballast). Over burnt brick, masonry in 1 lime: 1 sand: 2 cinder mortar. No damp proof course.

Superstructure—(1) Mixed class brickwork in lime (1 : 1 : 2) mortar. (2) Mixed class brickwork in mud mortar. (3) Half brick in C.M. 1 : 4 with hoop iron reinforcement. (4) Flat arch masonry in C.M. 1 : 3 for lintels.

Doors and Windows—1½″ thick soft wood—Panelled and glazed. battened and braced doors and windows. Iron fittings.

Roofing—4½″ R. B. roof over main rooms and 3″ thick R.B. slab with ½″ cement concrete floor on top finished with water proofing compound.

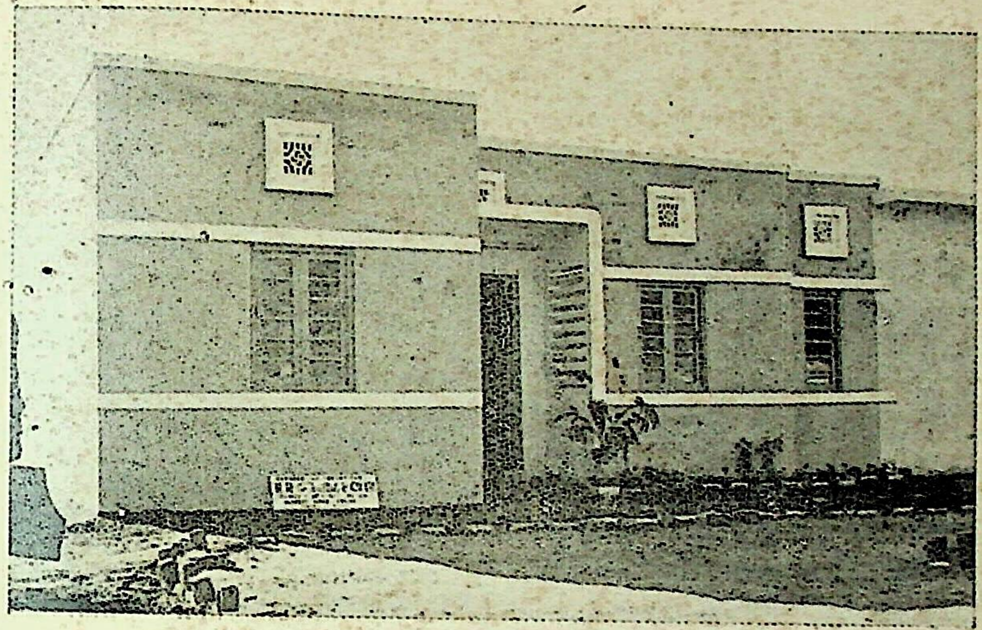
Finishing—½″ thick lime plaster of 1 cement : 6 lime : 12 sand and 3/8″ thick 1 : 6 cement plaster, is colour washed. Doors and windows are painted.

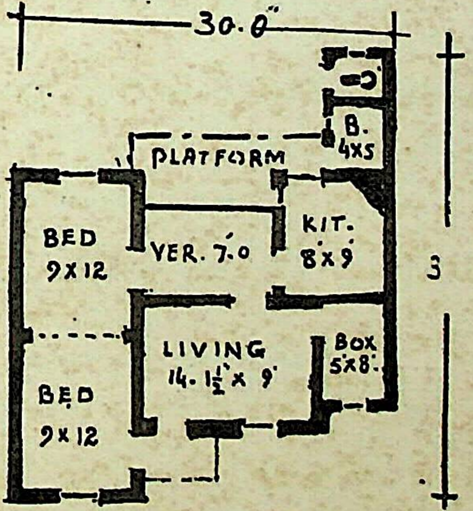
Flooring—1″ thick C.C. 1 : 2 : 4 over a bed of 3″ lime concrete 1 : 2 : 4.

Services—Indian pattern flush W.C. taps and electric points.

Special Features

1. Low (8′-0″) R.B. roof over verandah, kitchen, W.C. and bath.
2. Lime is used in masonry and plaster.





57.—ALL INDIA HOUSING ASSOCIATION.

58

If you want a portable house, here is one. It is constructed with Asbestos and Masonite sheets. The frame work is of timber. When the house is dismantled a great deal of it can be saved and used again.

DATA

		Bombay	Delhi	
1. Floor area	. . . .	256 s. ft.		
2. Plinth area	. . . .	267 s. ft.		
3. Cost at Bombay	. . .	Rs. 2,000		
Cost at Delhi		Rs. 2,000		
(excluding cost of services)				
		Rs. a.	Rs. a.	
4. Plinth area rate	. . . .	7 8	7 8	s. ft.
5. Floor area rate	. . . .	7 13	7 13	s. ft.

[The costs given here have been supplied by the Exhibitor.]

DETAILED SPECIFICATIONS

Foundation and Plinth—A wooden frame placed on 9″ × 9″ × 9″ concrete blocks placed at intervals.

Superstructure—Flat Asbestos sheet on outside and Masonite sheet in inside fixed to the wooden frame.

Doors and Windows—Flat Asbestos sheet on 3″ × 1″ battens.

Roofing—Asbestos trafford sheet roof.

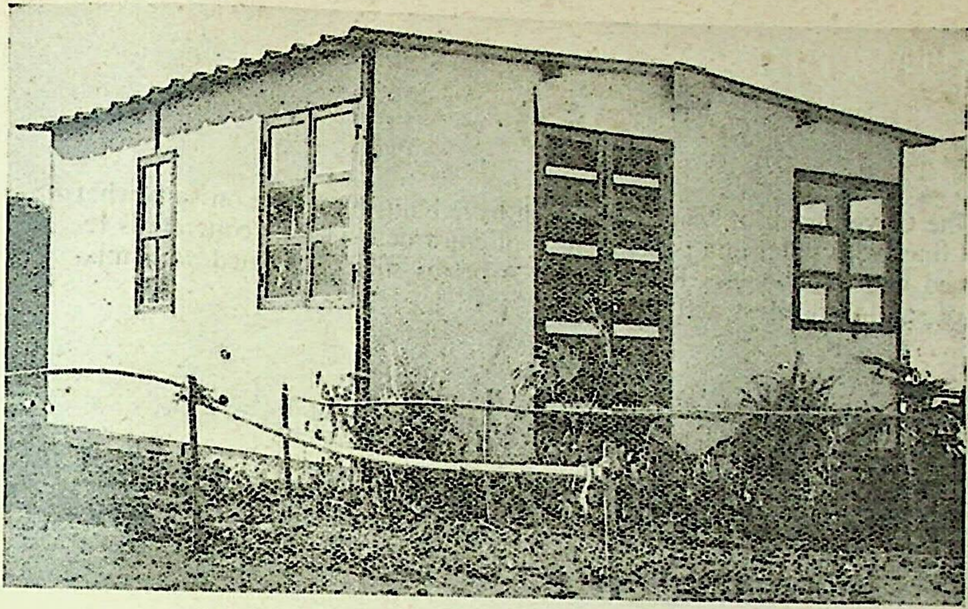
Finishing—Painting. Wood is treated with solignum before erecting.

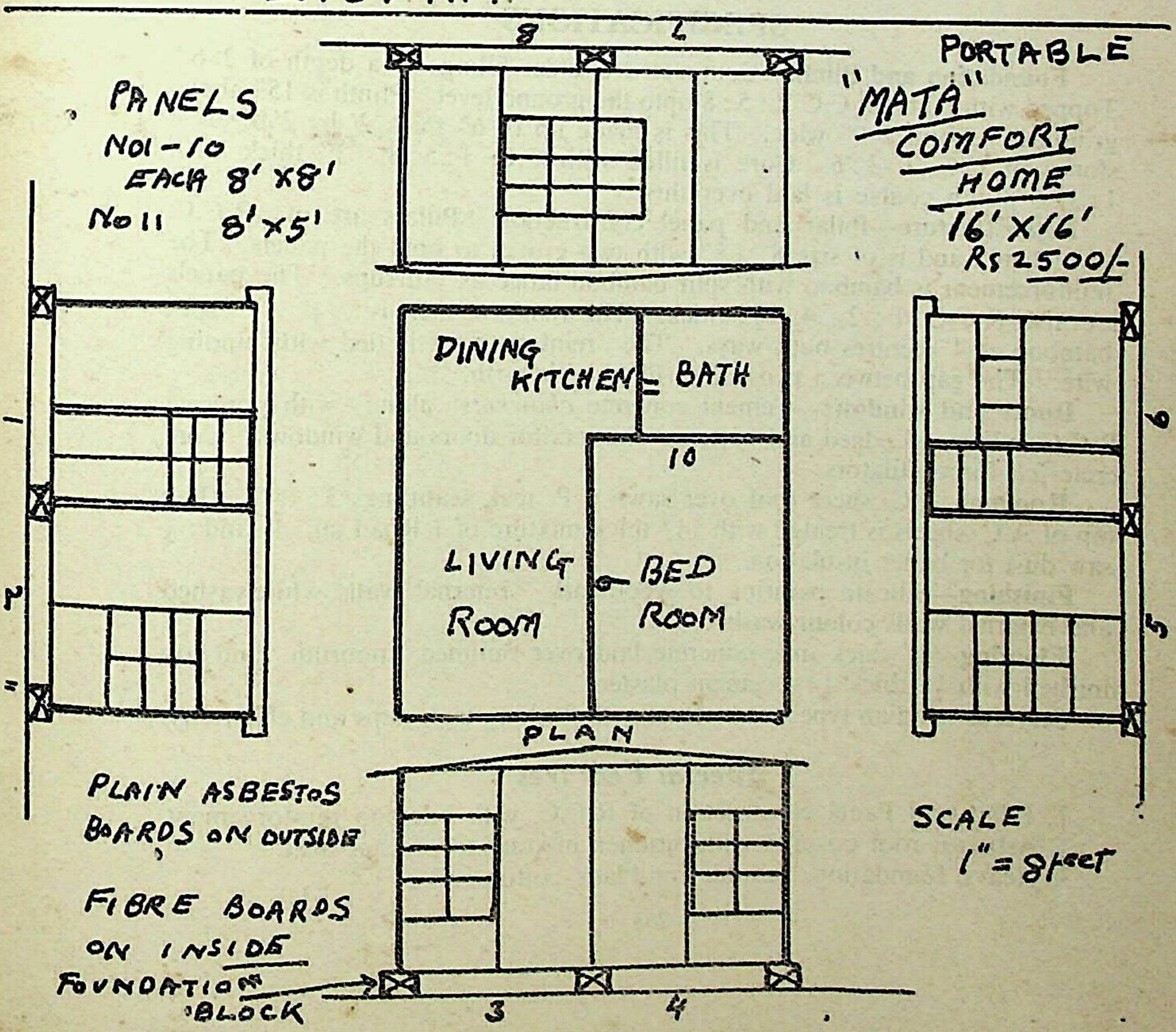
Flooring—Wooden boards on frame.

Services—Nil.

Special Features

1. Good salvage value.
2. Portable.





58.—SHRI GORE—PORTABLE HOUSE

59

The Government of Madhya Pradesh have built this house on somewhat novel lines with pillar and panel method of construction. The concrete is reinforced with bambooes. Roof is with Asbestos sheets insulated with mixture of sand, sand dust and bitumen.

DATA

1. Floor area		555 sq. ft.	
2. Plinth area		802 sq. ft.	
3. Cost at Madhya Pradesh		Rs. 5,000	
Cost at Delhi		Rs. 4,630	
	Rs. a.	Rs. a.	
4. Plinth area rate	6 4	5 13	sq. ft.
5. Floor area rate	9 0	8 6	sq. ft.

SPECIFICATIONS

Foundation and Plinth—Compacted boulder filling to a depth of 2′-6″. Topped with 6″ thick C.C. 1 : 5 : 8 upto the ground level. Plinth is 15″ above ground level and 2′-0″ wide. This is made up of 6″ thick 2′ by 2′-0″ base stones of C.C. 1 : 3 : 6. Core is filled with C.C. 1 : 5 : 8. 3″ thick C.C. 1 : 3 : 6 plinth course is laid over this.

Superstructure—Pillar and panel construction. Pillars are of R.C.C. 1 : 2 : 4 mix and is of size 8″ × 8″ with two groves to hold the panels. The reinforcement is bamboo with split bamboo latice as stirrups. The panels are also R.C.C. 1 : 2 : 4, 1½″ thick. The reinforcement is ⅜″ × ⅗″ split bamboo at 4″ centres both ways. The reinforcement is tied with binding wire. The gap between two panels filled with earth.

Doors and windows—Cement concrete *chowkats* along with precast R.C.C. pillars. Ledged and battened shutters for doors and windows. Concrete *jali* for ventilators.

Roofing—A.C. sheet roof over sawn C.P. teak scantlings 3″ × 4″. The top of A.C. sheets is treated with 1½″ thick mixture of 1 Road tar : 1 sand : ½ saw dust for better insulation.

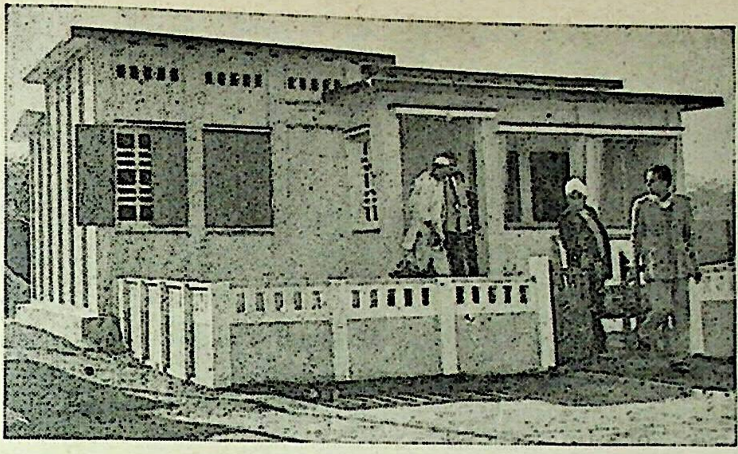
Finishing—Silicate painting to woodwork. Internal walls whitewashed and external walls colour washed.

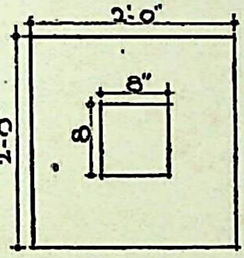
Flooring—3″ thick lime concrete laid over rammed moorum and top finished with ½″ thick 1 : 4 cement plaster.

Services—Indian type water closet with flushing tank, taps and electricity.

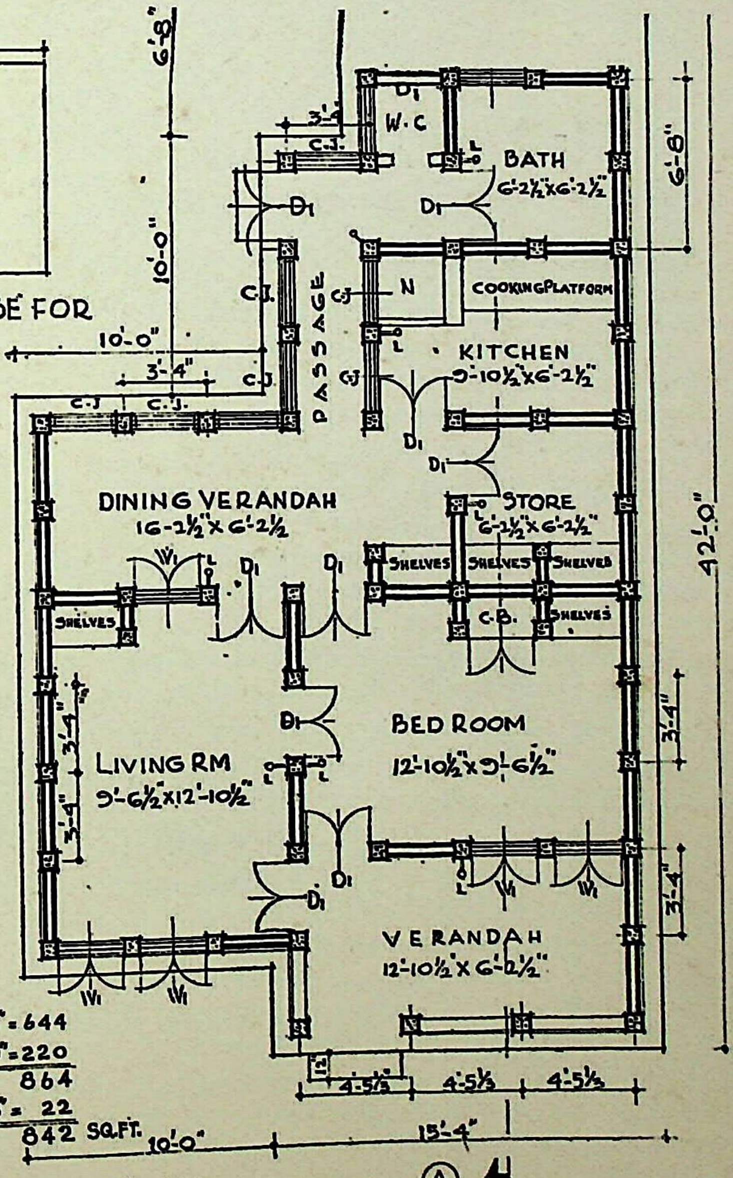
Special Features

1. Pillar and Panel construction of R.C.C. with bamboo reinforcement.
2. Asbestos roof covered with bitumen mixture to prevent heat.
3. Heavy foundation, suitable for black cotton soil.





PLAN OF BASE FOR PILLARS



PLINTH AREA:-

MAIN BLOCK :- 42'-0"x15'-4" = 644

SIDE " :- 22'-0"x10'-0" = 220

864

DEDUCT :- 3'-4"x6'-8" = 22

TOTAL :- 842 SQ.FT.

PLAN

59. GOVERNMENT OF MADHYA PRADESH.

60

This house is built of a non-traditional kind of material. By the use of foaming agent, cement concrete, is, expanded to the extent of 70 per cent over its original volume. It, therefore, reduces the amount of cement and other basic materials necessary for construction. It is also claimed that this type of construction has greater insulation capacity and is better protected against moisture.

DATA

1. Floor area	418 s. ft.		
2. Plinth area	483 s. ft.		
3. Cost at Tea Estates	Rs. 1,950/-/-		
Cost at Delhi (including services)	Rs. 2,650/-/-		
	Tea Estates	Delhi	
4. Plinth area rate	Rs. 4/-/-	5/8/-	per s. ft.
5. Floor area rate	Rs. 4/11/-	6/5/-	,, s. ft.

(The costs given here have been supplied by the Exhibitors)

SPECIFICATIONS

Foundation and Plinth—1′-6″ deep, 1′-6″ wide and filled with aerated cement concrete upto ground level. B.B. in C.M. 1 : 6 for plinth No D.P.C.

Superstructure—Aerated cement concrete, hollow block of 12″ × 6″ × 6″. With cement sand, and ⅜″ guage chips.

Doors and Windows—Wooden doors and Windows, wooden frame for doors and R.C.C. frames for windows.

Roofing—Asbestos cement sheet over RCC (1:2:3) roor trusses and purlins. Ceiling is of hessian on rabbit wire mesh and sprayed with aerocem mixture.

Finishing—Walls sprayed with aerated cement sand mixture. Final coat on outside sprayed with coloured cement and inside white washed.

Flooring—Aerated cement sand stone chips concrete.

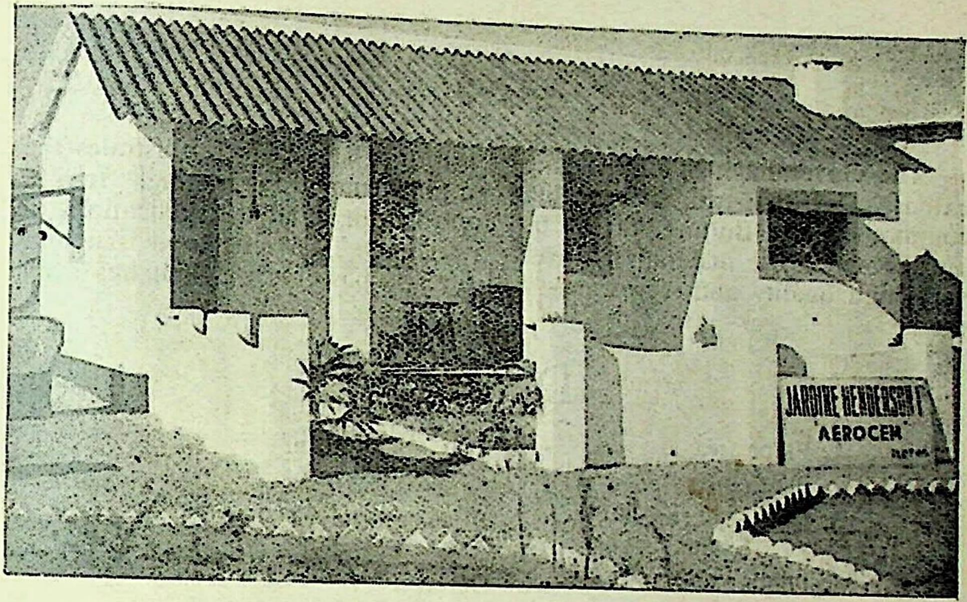
Services—Water taps in the latrine and bathing platform, Indian type hand flushed WC and no electricity.

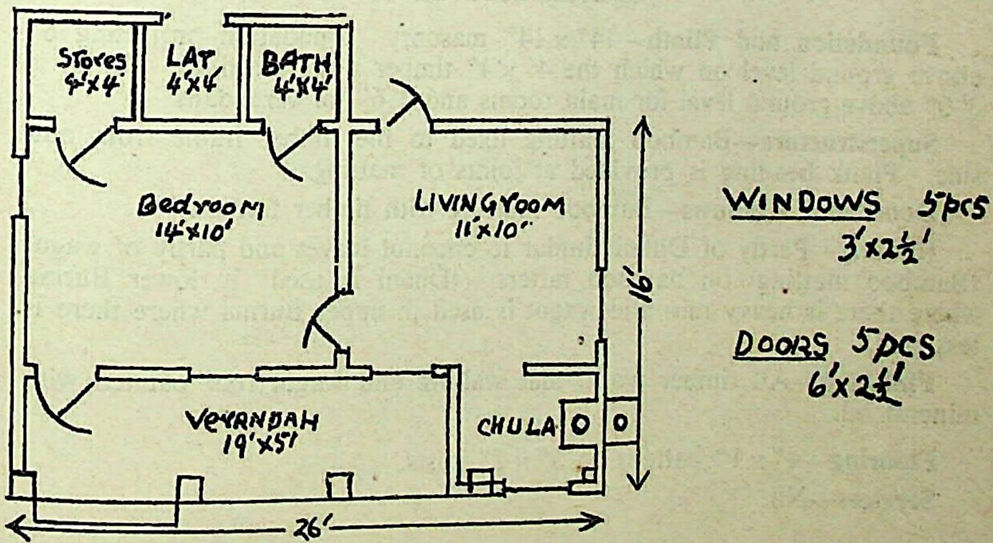
Special Features

1. The precast hollow blocks for walls are made after mixing the stone chips with the aerated cement sand mixture in a patent mixer.

2. The spraying of the aerated cement sand mixture is done by placing it in a pressure pot from which it is sprayed on to the work at 100 lbs. sq.″. The pressure is maintained by a compressor through the pressure pot. If spraying is not desirable the mixture can also be applied by hand.

3. The foaming agent increases the bulk by about 70% and thus using less cement. It is claimed that the blocks are water proof and heat proof. The cost is as given by the firm and not verified due to lack of data.





60.—M/S. JARDINE HENDERSON LTD., AEROCEM.

64

The Government of Burma have put up this house which illustrates the extensive use that can be made of wood and bamboo in housing. It is a common type in Burma, but can be adopted, with suitable modifications in areas where these materials are easily available. The wood used is not of very high quality and serves very well the purpose for which it has been used.

DATA

1. Floor area . . . . . . 648 s. ft.
2. Plinth area . . . . . 648 s. ft.
3. Cost at Burma . . . . . Rs. 2,200/-/-
   (Excluding cost of services)
4. Plinth area rate . . . . . Rs. 3/6/- per s. ft.
5. Floor area rate . . . . . Rs. 3/6/- ,, s. ft.
   (Cost at Delhi not computed)

SPECIFICATIONS

Foundation and Plinth—14″ × 14″ masonry foundation projecting 6″ above ground level on which the 4″ × 4″ timber posts are fixed. Plinth is 3′-0″ above ground level for main rooms and 2′-6″ for verandahs.

Superstructure—Bamboo matting fixed to the timber frame from outside. Plank beading is provided at joints of matting.

Doors and Windows—Bamboo matting with timber frames.

Roofing—Partly of Dhani similar to coconut leaves and partly of wagot (Bamboo matting) on bamboo rafters. (Dhani is used in lower Burma where there is heavy rain and wagot is used in upper Burma where there is less rain.)

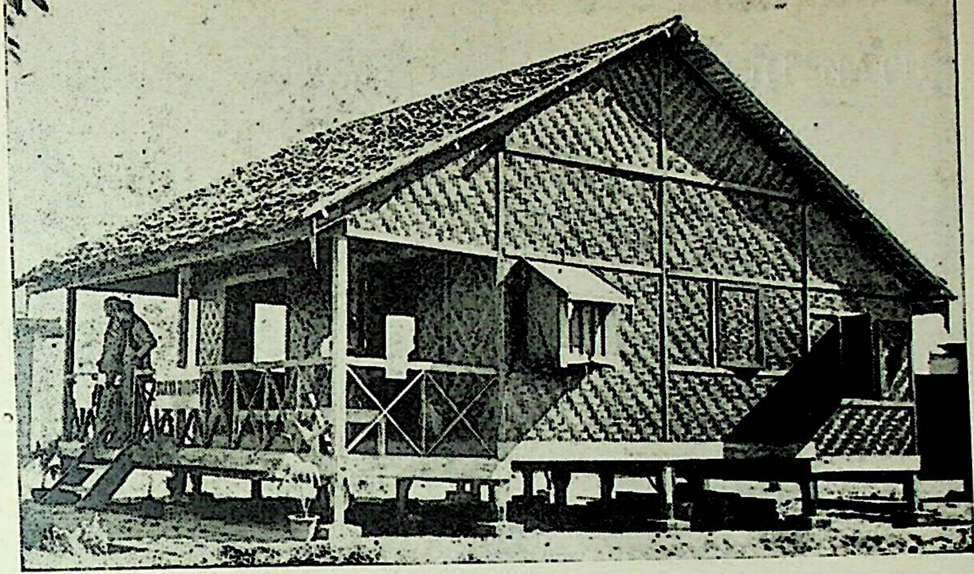
Finishing—All timber work, mat walling and wagot roof painted with mineral oil.

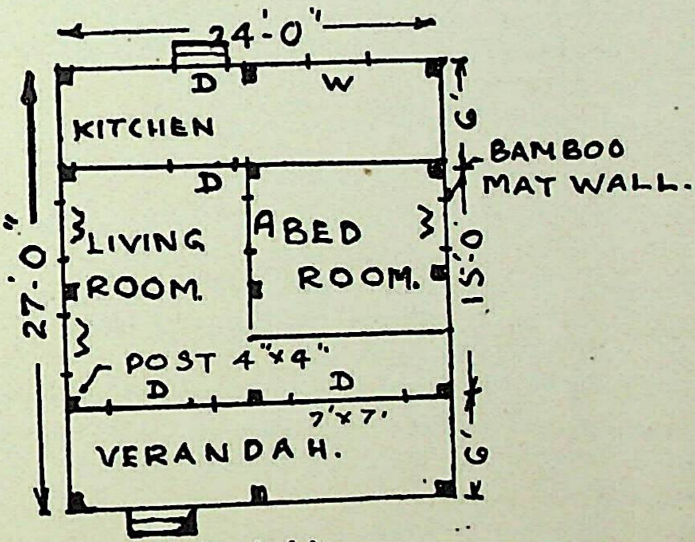
Flooring—4″ × 1″ battens on 3″ × 2″ joists.

Services—Nil.

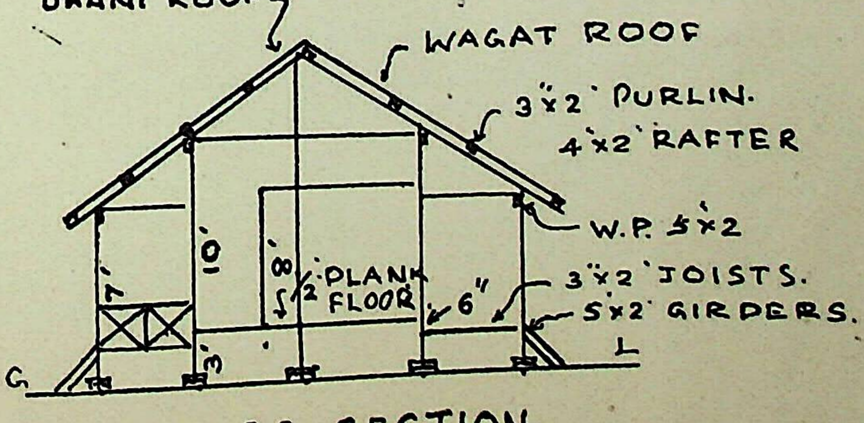
Special Features

This is a typical Burmese house. The house can be built by self help due to cheap and extensive availability of wood, bamboo and Dhani leaves. The cost is given by the Burmese Government and not susceptible to check in Delhi.





PLAN



CROSS SECTION

64.—GOVERNMENT OF BURMA.

65—66

This is another house put up by the Forest Research Institute, Dehra Dun. The superstructure is built entirely of timber and bamboo. The frame is made of treated timber and the panels, both in the walls and the roof, are made of bamboo boards. These boards are manufactured by pressing woven bamboo under high pressure with steam.

DATA

1. Floor area . . . . . . 475 s. ft.
2. Plinth area . . . . . 521 s. ft.
3. Cost at Delhi (excluding the cost of services) . . . . . Rs. 4,000/-/-
4. Plinth area rate . . . . . Rs. 7/11/- per s. ft.
5. Floor area rate . . . . . Rs. 8/6/- „ s. ft.

(The costs given here have been supplied by the Exhibitors)

SPECIFICATIONS

Foundation and Plinth—Excavation 2′-0″ × 9″ B.B. in C.M. 1:6 plinth. Load carrying wooden pillar 4″ × 2″ fixed with bolts in C.C. 1:5:10.

Superstructures—Treated chir or other soft wood frame of 2″ × 2″ horizontals fixed to 4″ × 2″ verticals. Walling is of compressed bamboo mat boards or, wood chips boards.

Doors and windows—Soft-wood panelled doors and windows.

Roofing—Compressed bamboo mat boards, and wood chip boards fixed over common rafter of 3″ × 2″ and 5″ × 2″ ridge, valley and hip rafters.

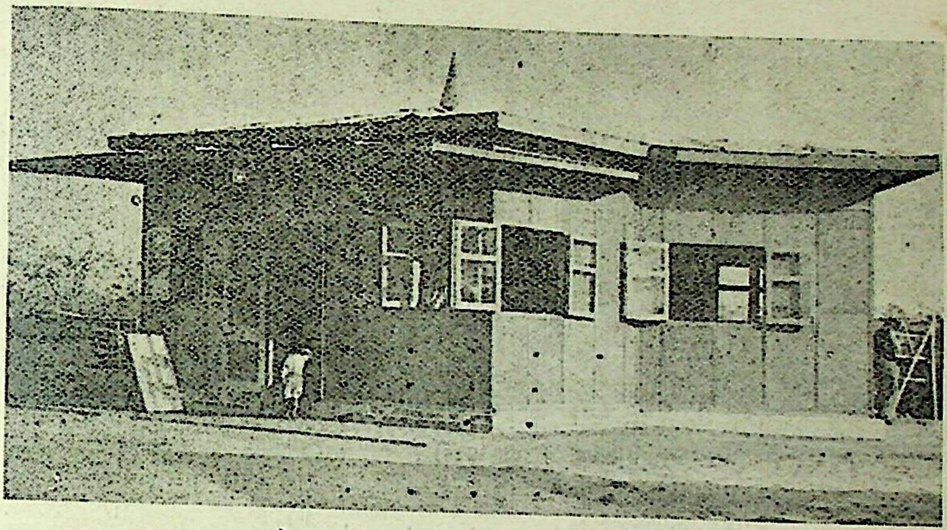
Finishing—Nil.

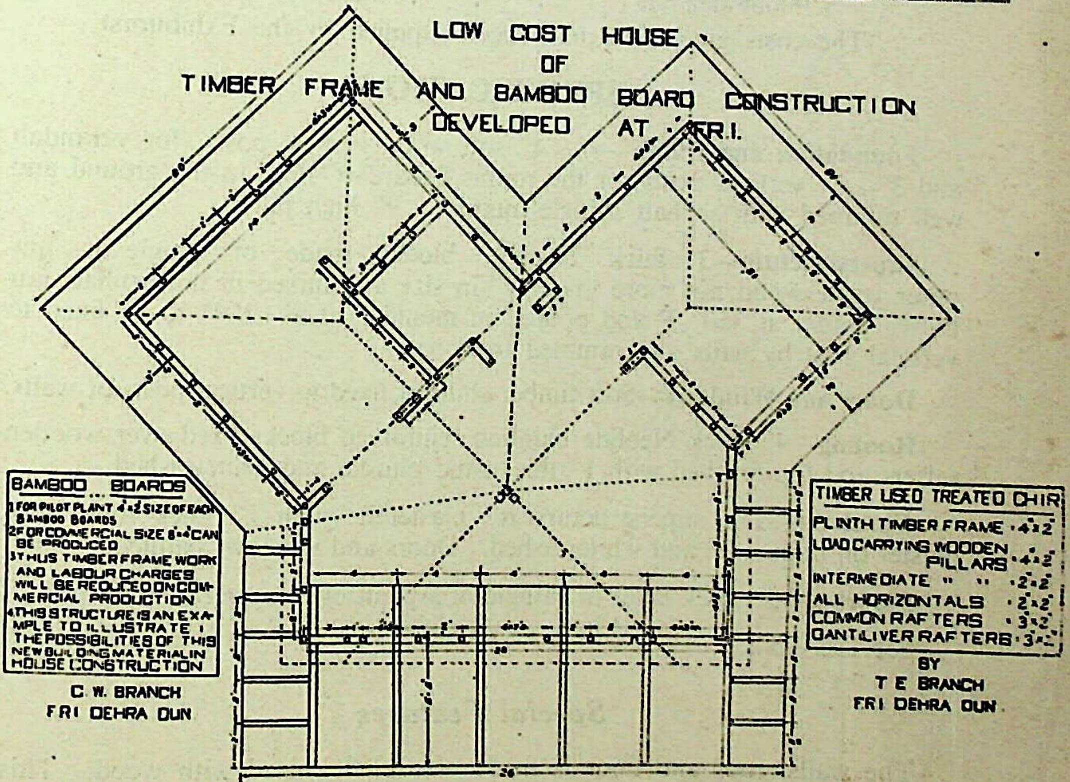
Flooring—2″ thick Indian patent stone flooring over rammed earth and stone chips.

Services—Nil.

Special Features

The house is built to show the technique of using Compressed bamboo mat boards, and wood chip boards etc., manufactured by the Pilot plant at the Forest Research Institute. The size of panels as manufactured by them are 4′ × 2′, but if these panels are made 8′ × 4′ which is the commercial size, nearly 21 cft. of wood in the frame work of the building can be saved. The wood used are all treated. The cementing agent for these mats is reported to be phenol phormaldehyde resin. The woven bamboo mat is hydraulically pressed under steam and the resin is used which gives an attractive finish.





65-66.—FOREST RESEARCH INSTITUTE, DEHRA DUN.

68

This house, intended for rural areas, has been put up by the Rational Planning Corporation Limited, Bombay. It makes use of material called "Neolyte". The material is made out of asphalt and scraps of wood.

DATA

1.	Floor area	367 s. ft.
2.	Plinth area	390 s. ft.
3.	Cost at Delhi (excluding cost of services)	Rs. 2,200/-/-
4.	Plinth area rate	Rs. 5/10/- per s. ft.
5.	Floor area rate	Rs. 6/-/- „ s. ft.

(The costs given here have been supplied by the Exhibitors)

SPECIFICATIONS

Foundation and Plinth—4″ × 4″ soft wood vertical posts for verandah and 3″ × 3″ vertical posts for the rooms fixed 2′-0″ deep in the ground and well rammed with asphalt shingle mixture. 9″ high plinth.

Superstructure—3″ thick Neolyte blocks made of jungle or any other waste wood not more than $1\frac{1}{2}$″ in size and mixed in hot asphalt (air blown grade) at 350° F and poured in moulds of 3′ × 1′-4″ to be fixed to vertical post by nails and rammed from top.

Doors and Windows—Soft timber shutters fixed to vertical posts of walls.

Roofing—4″ thick Neolyte bamboo reinforced blocks fixed over wooden rafters and top finished with 1″ thick mud phuska and whitewashed.

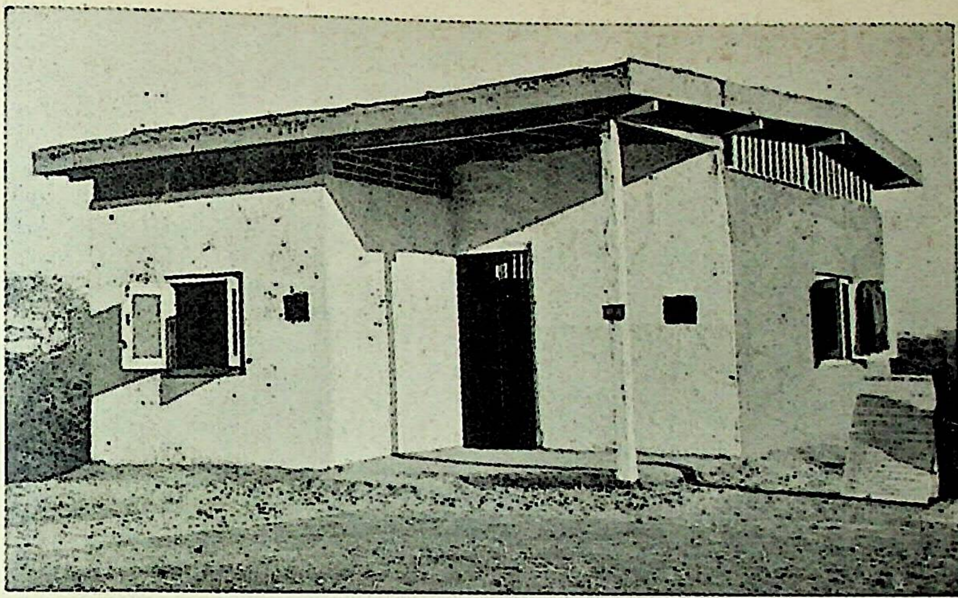
Finishing—The superstructure is plastered with 1″ thick mud husk plaster on both sides and whitewashed. Doors and windows painted.

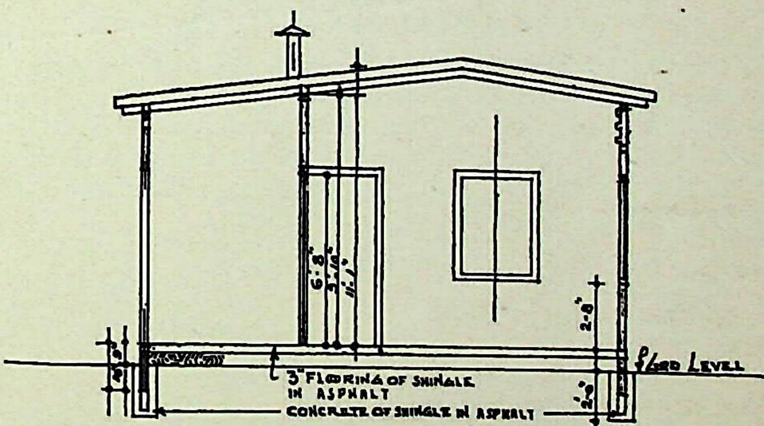
Flooring—3″ thick layer of shingle in asphalt over rammed earth.

Services—Nil.

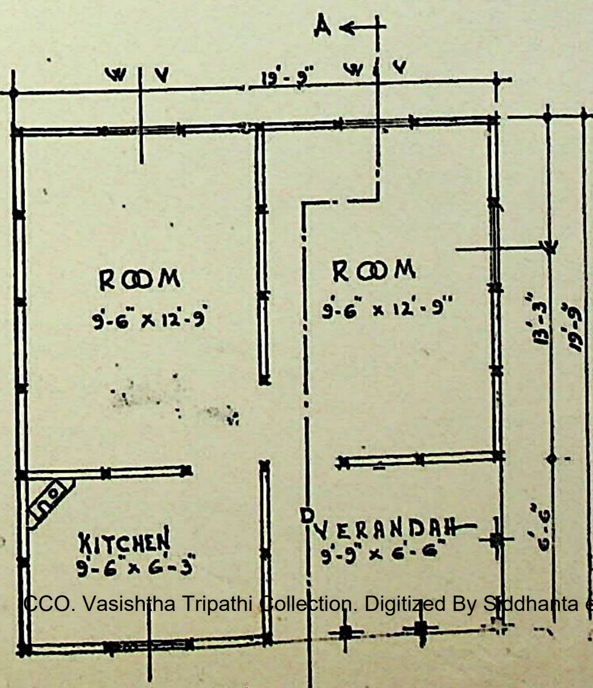
Special Features

The walls, roof and floor is made of asphalt mixed with wood. This is a house of asphalt and jungle wood. Probably may be useful where asphalt is very cheap.

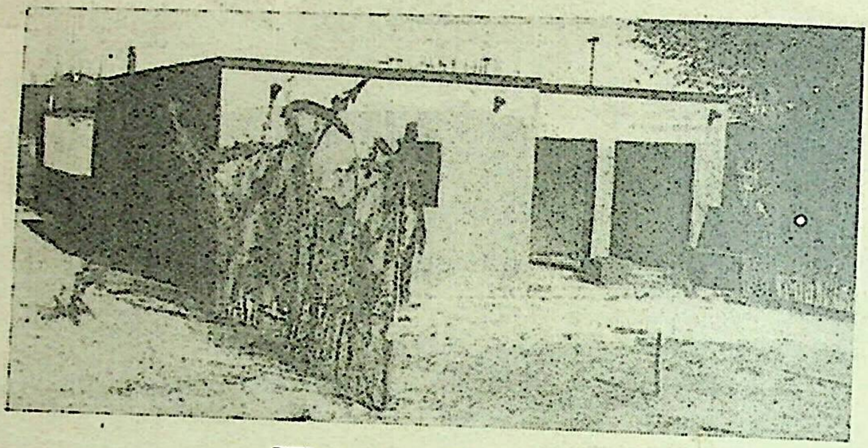




SECTION A.A.



68.—THE RATIONAL PLANNING CORPORATION—NEOLYTE



Rural.—A

This is a house the specification of which has been designed in such a manner that it is easy for the family itself to build it by stages. It uses some recent techniques for making raw earth suitable and reasonably durable building material. The house can also be constructed in rows and such construction would reduce the cost per house still further. The design is spacious and has a distinctly rural orientation.

DATA

		Value	
1.	Floor area	842 sq. ft.	Cost of materials
2.	Plinth area	1,234 sq. ft.	1st stage: Rs. 650.
		Rs. as.	2nd stage: Rs. 350.
3.	Cost as constructed	3,400	
4.	Plinth area rate	2 12 sq. ft.	
5.	Floor area rate	4 0 sq. ft.	

SPECIFICATIONS

Foundation and Plinth—2′-0″ wide 2′-0″ deep. Stabilised soil using 2·5 % cement in foundation and plinth.

Superstructure—Graded soil without cement compacted at the optimum moisture and Burnt brick pillars with sun-dried brick panels.

Doors and Windows—Soft-wood battened and braced doors and windows with 3″ × 4″ frames. Iron fittings.

Roofing—For cattle-shed—thatch roof.

Hay store—G.I. Sheet roof.

For rooms—Wooden rafters topped with brick tiles 12″ × 6″ × 2″ and covered with mud *phuska*.

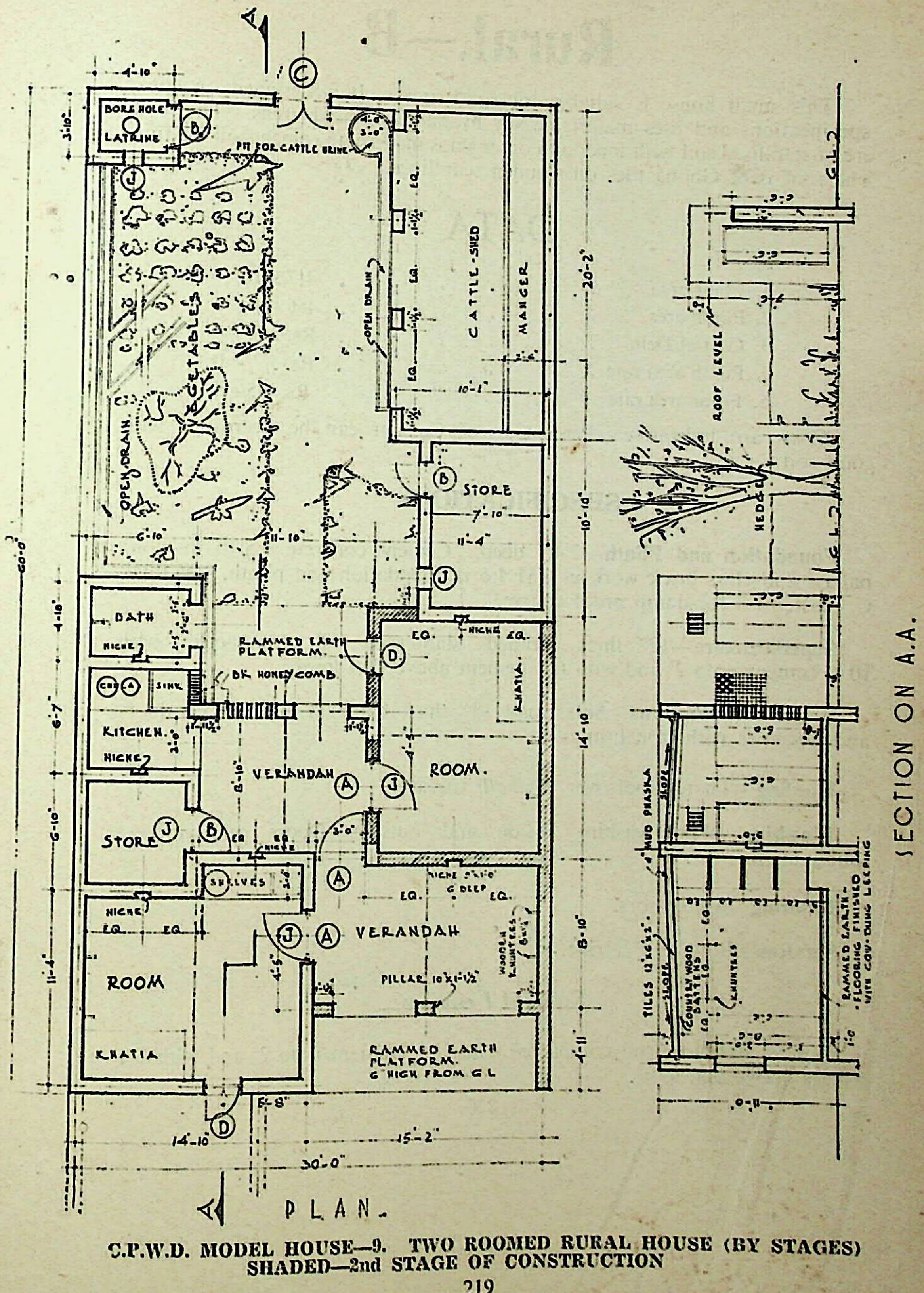
Finishing—Inside mud plaster. Outside mud plaster with 5% bitumen.

Flooring—For cattle shed, bath and kitchen—flat brick flooring and cement plaster. For rooms—mud floors.

Services—Pit latrine and masonry drain.

Special Feature

Growing house can be built under aided self-help programme in two stages by the villagers themselves with local materials at a cost of Rs. 1,000 to Rs. 1,200.



C.P.W.D. MODEL HOUSE—9. TWO ROOMED RURAL HOUSE (BY STAGES)
SHADED—2nd STAGE OF CONSTRUCTION

Rural.—B

This small house is suitable for rural areas. It is designed on cheap specifications and uses material easily available in rural areas. The walls are of stabilised soil with inner and outer skins made with cement-soil mixture. The roof is of Goona tiles on wooden scantlings.

DATA

1. Floor area . . . . . . 417 s. ft.
2. Plinth area . . . . . . 486 s. ft.
3. Cost at Delhi . . . . . . Rs. 2,634/-/-
4. Plinth area rate . . . . . . Rs. 5/7/- ft.
5. Floor area rate . . . . . . Rs. 6/5/- „

(Costs are indicative. Percentage of Cement can be decreased with good soil.)

SPECIFICATIONS

Foundation and Plinth—2′-0″ deep. Cement concrete 1:5:10 in stone ballast 2nd class brick work in CM 1:6 in foundation and plinth. ½″ thick C. plaster 1:3 for damp proof course.

Superstructure—12″ thick graded stabilised soil compacted with 10% cement upto 2′ and with 6% cement above that level.

Doors and Windows—Soft wood 1¾″ thick battened and braced doors and windows with iron fittings.

Roofing—Thatch roof over *Salballi* trusses.

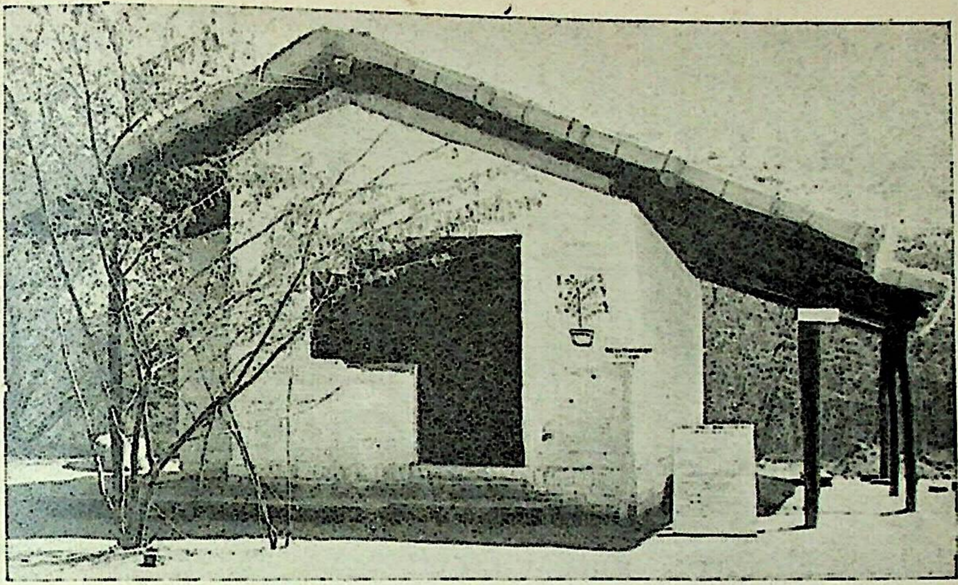
Finishing—White washing inside and outside. Doors and windows solignum. painted.

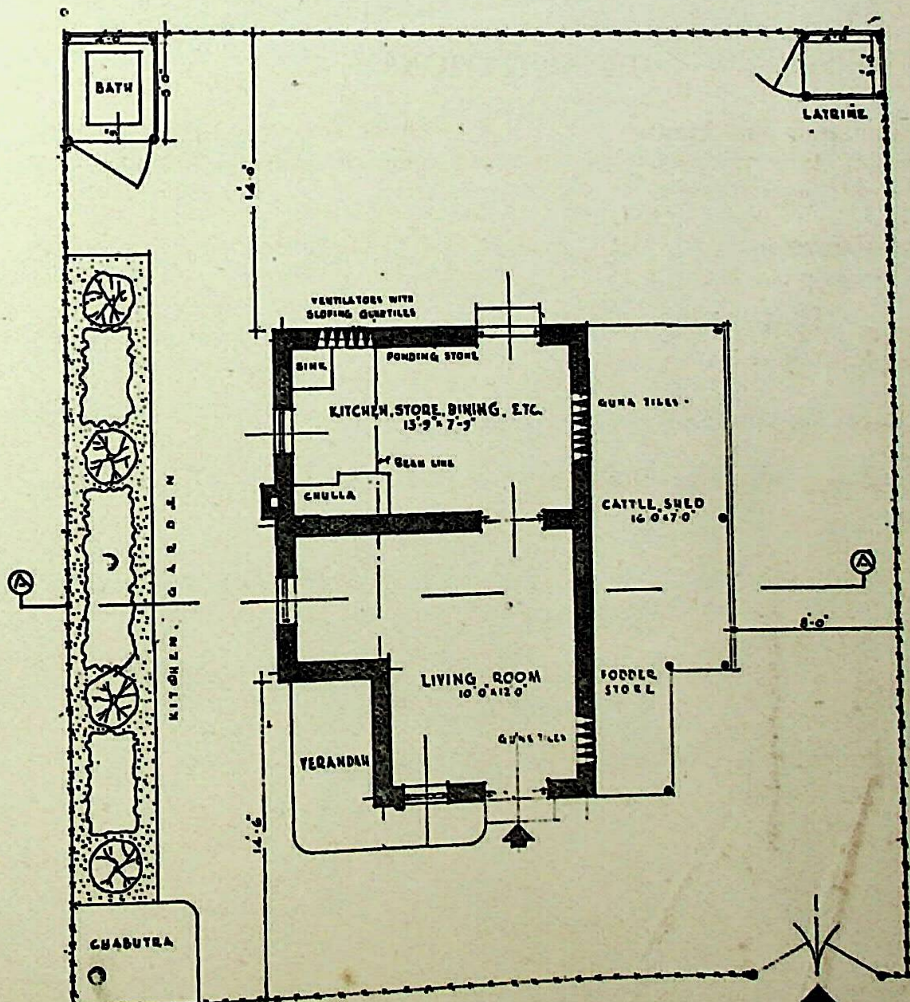
Flooring—Mud floors.

Services—Bore hole latrine.

Special Feature

Graded stabilised soil compacted with 10% cement upto 2′ and with 6% cement above that level.





PLAN

MODEL HOUSE CONSTRUCTED WITH THE HELP OF U.N. ADVISER —RURAL B.

Rural.—C

This is a small unit suitable for most parts of Northern India. Its special feature is the provision of two rooms in the front, a separate kitchen block at some distance and a central open courtyard in between. It is built completely of ordinary materials.

DATA

1. Floor area . . . . . . 409 s. ft.
2. Plinth area . . . . . . 524 s. ft.
3. Cost at Delhi . . . . . . Rs. 2,918 /-/-

(Cost could be appreciably reduced with aided self help in villages).

4. Plinth area rate . . . . . . Rs. 5/4/- s. ft.
5. Floor area rate . . . . . . Rs. 7/2/- s. ft.

(excluding cost of services)

SPECIFICATIONS

Foundation and Plinth—2′-6″ deep. 9″ thick lime concrete with brick ballast. Masonry in second class brickwork in C.M. 1 : 8. ½″ thick C.M. 1 : 3 is provided as damp proof course.

Superstructure—2nd class brickwork in mud mortar, brickwork in C.M. 1 : 4 for half brick partitions. Brick arches over opening.

Doors and Windows—Soft wood battened and braced doors and windows with 2 × 3″ frames.

Roofing—(1) Brick tiles laid in C.M. 1,3 over 3½″ ballies or wooden rafter and top covered with 4″ mud phuska in all rooms.

Finishing—¾″ mud plaster. Whitewashing inside. Doors and windows painted.

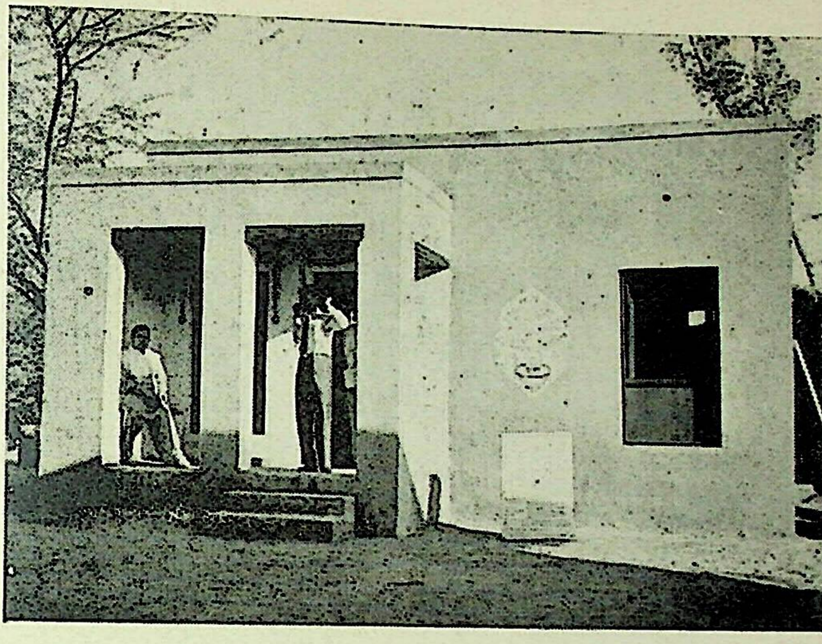
Flooring—(1) Flooring with 3″ thick cement concrete 1:3:6 and top finished with a floating coat in bath and W.C.

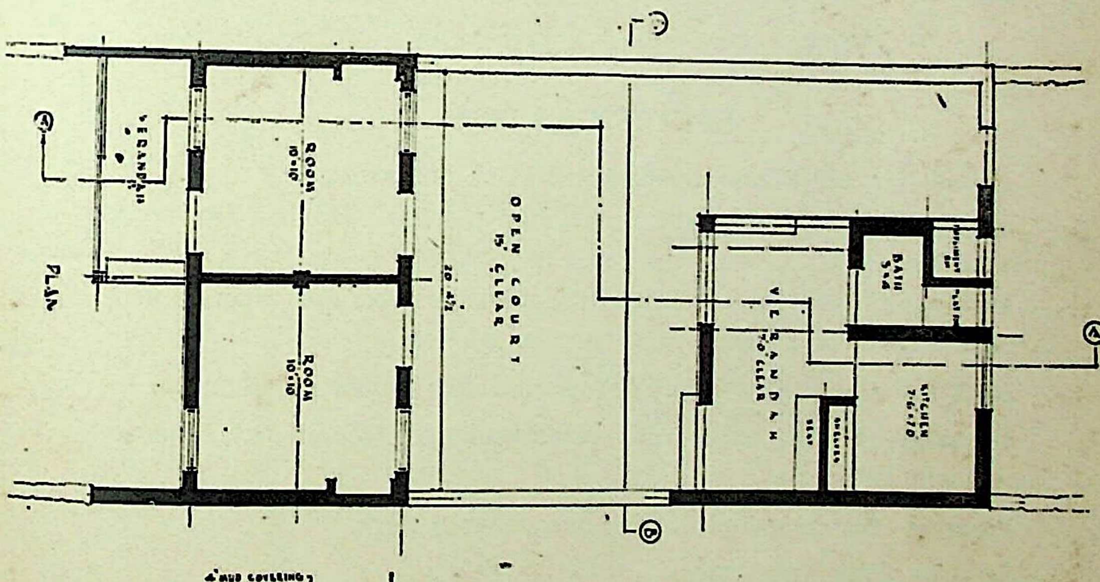
(2) Gobri leaping in other rooms.

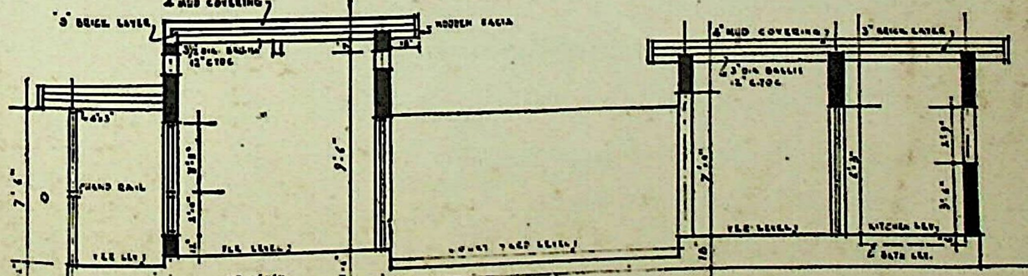
Services—Nil.

Special Features

1. Suitable for Rural areas of hot and dry region.
2. Mud plaster.
3. Mud floor.







SECTION ON (A)(A)

CENTRAL P.W.D. MODEL HOUSE 6—RURAL.—C.

Rural.—W—1

This is a house put up by the Government of West Bengal designed for rural areas. Sun dried bricks are used for walls and country tiles for roof.

DATA

1. Floor area . . . . 594 sq. ft.
2. Plinth area . . . . 695 sq. ft.
3. Cost at Bengal . . . . Rs. 3,200
   Cost at Delhi . . . . Rs. 2,520

	Bengal	*Delhi*	
	Rs. a.	Rs. a.	
4. Plinth area rate	4 10	3 10	sq. ft.
5. Floor area rate	5 6	4 4	sq. ft.

SPECIFICATIONS

Foundation and Plinth—Sundried bricks in mud mortar.

Superstructure—Sundried bricks in mud mortar. Bamboo *Jafri* work in verandah.

Doors and Windows— ¾″ Salwood shutters for doors and windows with salwood frames. 5/8″ dia. M.S. bars for windows.

Roof—*Narial* (country) tile roofing with *bally* frames etc. complete.

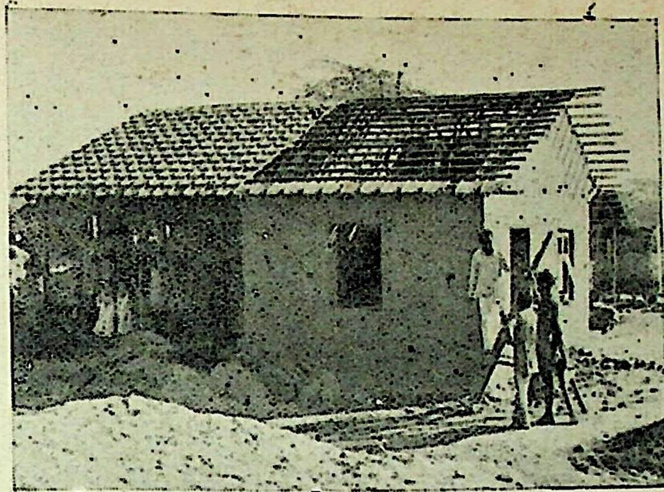
Finishing—Mudplastering and colour washing. Doors and windows painted with two coats.

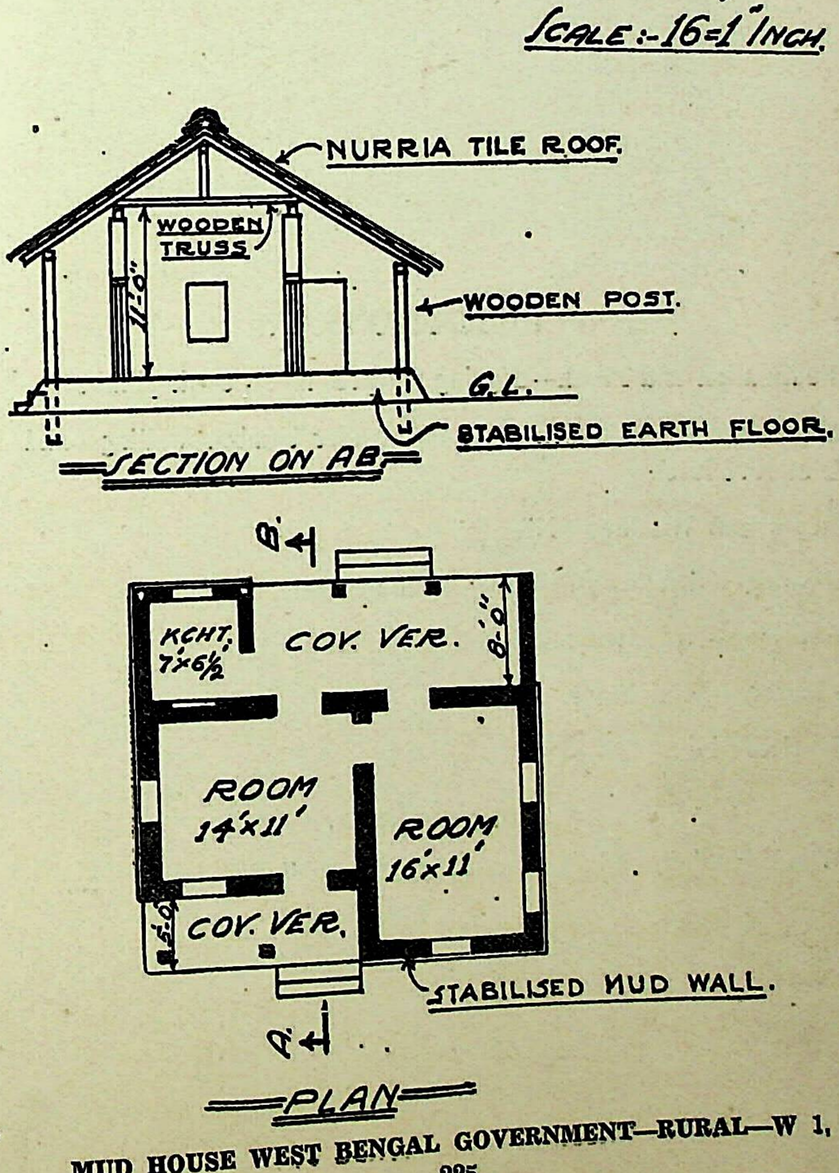
Flooring—Stabilised soil flooring over rammed earth.

Services—Dug well latrine.

Special Features

1. Sun dried brick walls—mud Plaster.
2. Stabilised soil floor over rammed earth.
3. Bomboo *Jafri* to the verandah.
4. *Nurriah* tile roofing.





MUD HOUSE WEST BENGAL GOVERNMENT—RURAL—W 1.

Rural.—W-2

This is a small hall like structure called Chandimandap that one comes across in the rural areas of West Bengal. Only wood, bamboo and thatch are used. The shape of the roof is worth observing.

DATA

1. Floor area	300 s. ft.			
2. Plinth area	316 s. ft.			
3. Cost at Delhi	Rs. 1,640			
Cost at Bengal	Rs. 1,480			
	Bengal	*Delhi*		
	Rs. a.	Rs. a.		
4. Plinth area rate	5 3	4 11	ft.	
5. Floor area rate	5 8	4 14	ft.	

SPECIFICATIONS

Foundation and Plinth—Digging for post holes, earth plinth.

Superstructure—Wooden posts with *Mulee* bamboo walling and *jaffri* work at roof level.

Doors and Windows—Nil.

Roofing—Thatch roofing over bamboo frames.

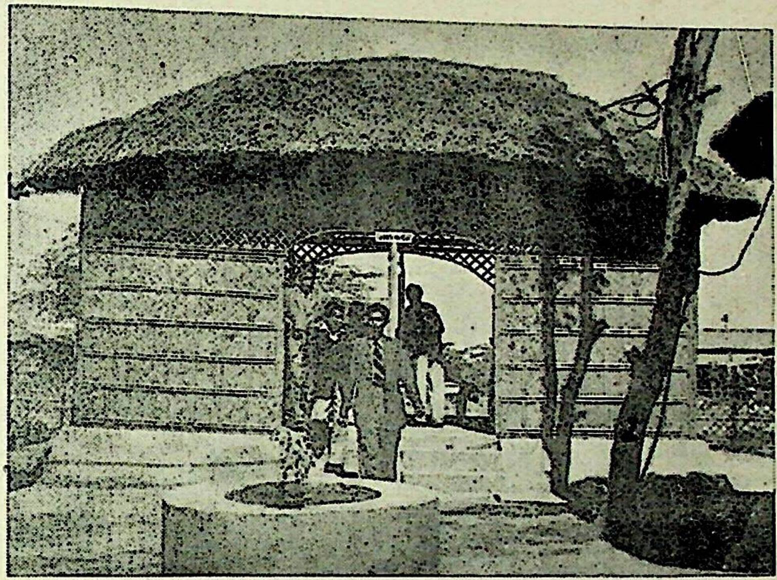
Finishing—Woodwork painted.

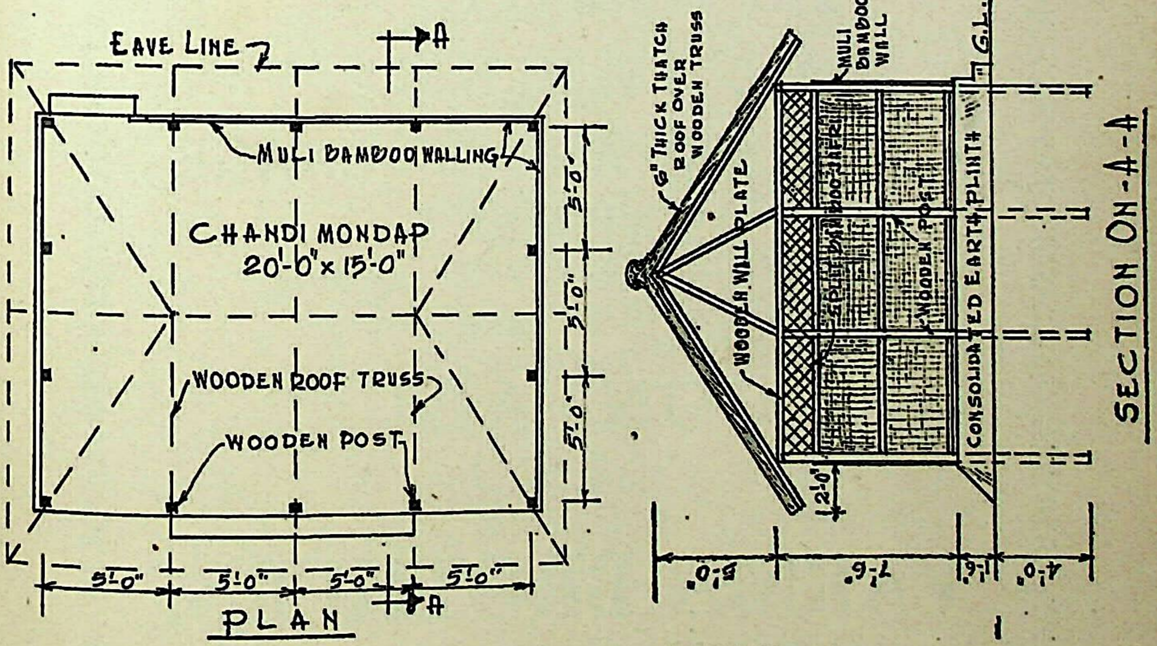
Flooring—Mud Floor.

Services—Nil.

Special Feature

Wood, bamboo and thatch structure for public in a rural area.

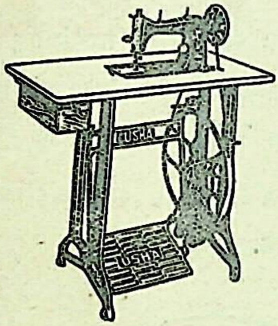




W.2—WEST BENGAL GOVERNMENT
W.2—RURAL UNIT—CHANDIMANDAP.

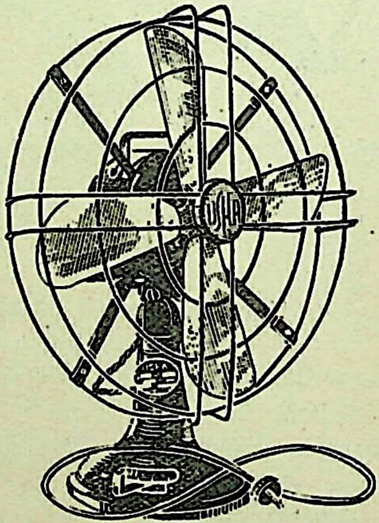
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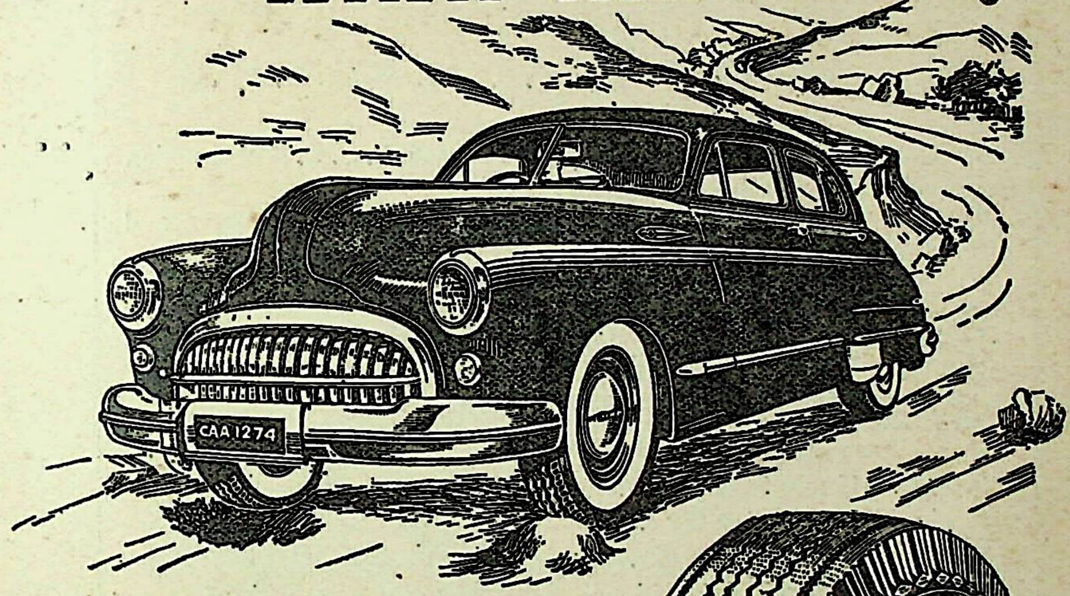
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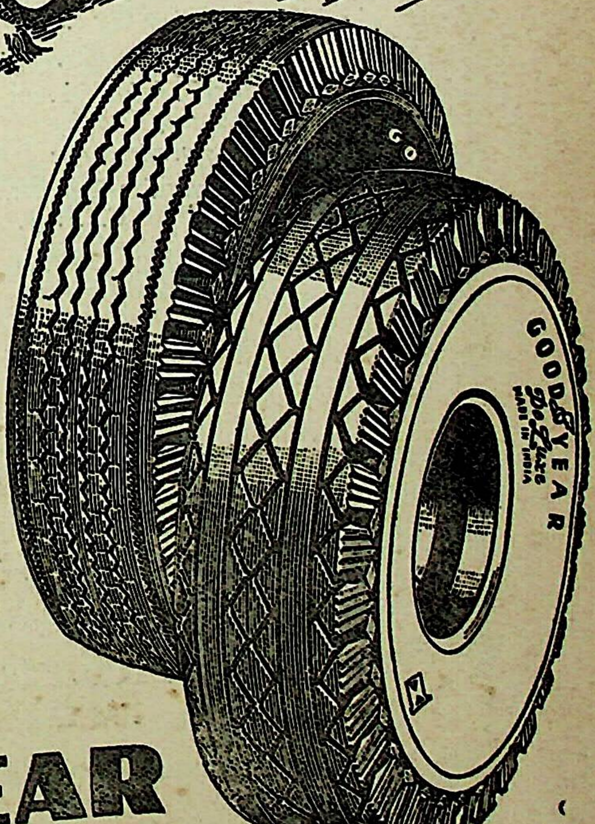
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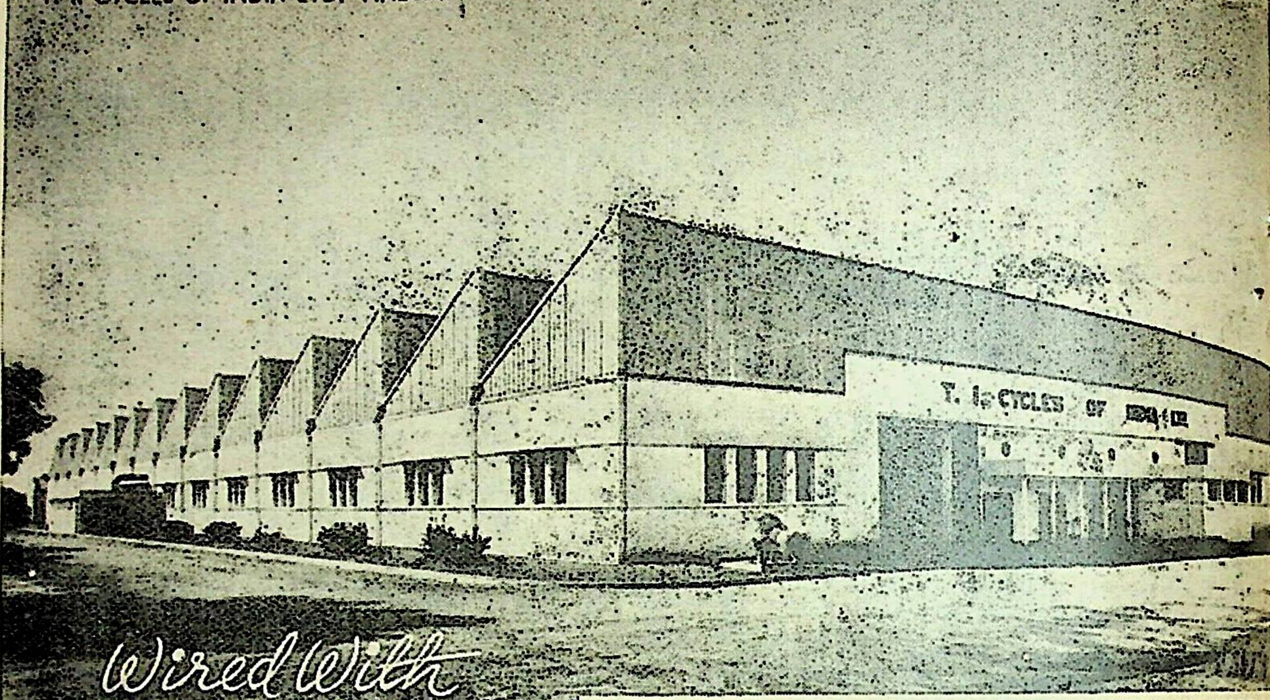
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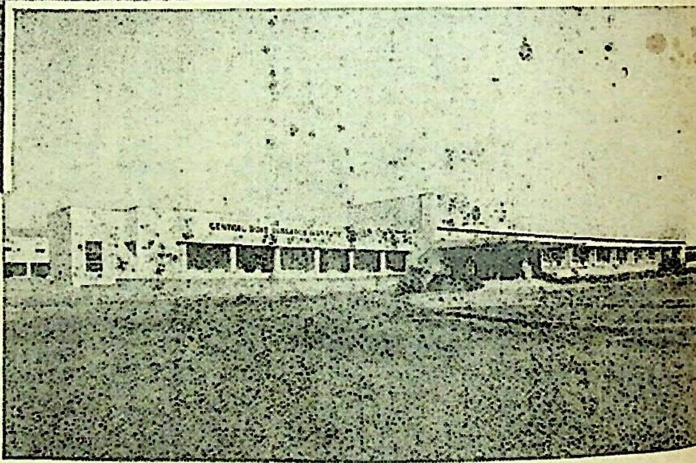
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FDS 5P

HEAVY AND LIGHT MACHINERY SECTION

This section of the Exhibition houses in a separate hall, the exhibits from the Central Public Works Department, the Engineer-in-Chief, India, Messrs Larsen and Toubro, Ltd., and the Faridabad Development Board.

A. CENTRAL PUBLIC WORKS DEPARTMENT.—The exhibits of the C.P.W.D. consist of a Mobile Workshop; Break-down-vehicle; Mobile Air Compressor with pneumatic tools and crane; Steam Road Roller (1910 model); Concrete mixer; Lime pan mixer; Mobile Crane; Auto Hoist; Mini Hoist; Trailor pump; Table Vibrator; Circular Saw; Portable Power lawn Mower; Chain Saw; Portable Allen Auto Analyser; Electric Test Bench; Stream line filter; Electric welding set; Auto-shop; Air conditioning and Machine shop tools; Light fittings and street light brackets; Concrete Finisher; Airport Runway Lighting model; Air Conditioning model of Central Secretariat; Air Conditioning model of Parliament House and Air Conditioning model of Junior Officers' Flats.

B. ENGINEER-IN-CHIEF, INDIA.—The Army Engineers show a drag line Excavator and Shoval; Crawler Tractor with angle dozer D-8; Crawler Tractor with bull dozer D-4; Motor grader D-12; Air Compressors; Sheep-foot-roller; Wobbly Wheel Rollers and Special repair and Maintenance Tools.

C. MESSRS LARSEN & TOUBRO, LTD.—A Multipurpose Wood working machine; Wood Planner; Dairy Machinery; Refrigerator and Automatic Control Equipments; Catering machinery; Capsules and Bottling machinery and Hirco Filters are exhibited by Messrs Larsen and Toubro, Ltd.

D. FARIDABAD DEVELOPMENT BOARD.—A Diesel Engine 12 B.H.P. is exhibited by the Faridabad Development Board.

OTHER EXHIBITS

The hall which houses the Five Year Plan Exhibition also contains Exhibits from the:—

(i) Directorate General of Health Services;

(ii) Building and Road Research Laboratory, Karnal;

(iii) Delhi State;

(iv) Indian Central Oilseed Committee, Hyderabad;

(v) Travancore-Cochin State;

(vi) Posts and Telegraphs Department;

(vii) Low-Cost Housing Competition;

(viii) Government of India Building Projects.

Directorate General of Health Services.—This stall contains photographs, illustrations, diagrams, charts and models and explains Maternity and child welfare; T.B. control; Public health; Protected rural water supplies; Safe public water supplies in India, Sanitation; Malaria and malaria control, etc.

Building and Road Research Laboratory, Karnal (Punjab).—The stall put up by the Building and Roads Research Laboratory, Karnal (Punjab), deals with stabilised soil for low-cost roads. Samples, diagrams, charts and pictures explaining the technique are exhibited.

Delhi State.—This stall shows the housing activities of the Delhi State Government. Photographs, models, plans, etc., depict various Housing activities and rehousing, slum clearance, Models of townships, Central Jail for Delhi State near Tilak Nagar, Diagramatic section of the rapid gravity filtration plant, Water Board and Sewage Disposal Work, activities of Delhi Improvement Trust and Security Staff quarters of the Delhi State Government.

Indian Central Oil Seeds Committee, Hyderabad (Deccan).—This stall, put up by the Indian Central Oil Seeds Committee, Hyderabad (Deccan) shows charts, diagrams, samples of various oilseeds like linseed, sesamum, mustard and groundnut, etc.

Travancore-Cochin Government.—This stall relates to the housing activities of the Travancore-Cochin Government and shows photographs and plans of various types of housing built in that State.

Posts & Telegraphs Department.—This stall contains Exhibits of the Posts and Telegraphs buildings put up by the Central Public Works Depart-

ment. Photographs, plans and perspectives are shown of various types of quarters for the staff of Post and Telegraph Department; Exchange Buildings; Telephone Exchange, Secundrabad; Extensions to Post Offices at Cuttack and Karolbagh (Delhi); Auto Exchange at Karolbagh, Exchange at Tis Hazari (Delhi); Telecommunication Building, Lucknow; Training Centre at Jubbalpore; Telephone Exchange at Dehra Dun; Telephone Exchange at Bangalore, etc.

DESIGNS FOR LOW-COST HOUSING COMPETITION.—The first design is for a low-cost House suitable for the Hot and Dry climate which won the President's Gold Medal. The second design is the one suitable for Hot and Humid climate, which also won the President's Gold Medal. The other winning design which secured the Silver Medal is for Hot and Humid area. A few other designs which were very highly commended for low-cost housing for the different climatic regions are also displayed. Next to these are the designs and models of the town planning schemes for industrial housing, which also won the President's Gold and Silver Awards.

GOVERNMENT OF INDIA BUILDING PROJECTS.—This stall shows models, layouts and drawings of various major proposed Government buildings, such as the Supreme Court; the District Courts and Administrative Building at Tis Hazari (Delhi); the Fertilizer Factory, Sindri; the new office buildings for Government of India on Queen Victoria Road, New Delhi, and the Administrative Building at Nelokheri, etc. Layouts of the various townships such as Tihar Western Neighbourhood, South Krishan Nagar, New Rajinder Nagar, Yusaf Sarai. development plan showing housing schemes of Greater Delhi. Peons' Colony near Mubarak Kotla, Housing scheme for the National Physical Laboratory. etc. are also displayed.

Shown also are the activities of the Civil Aviation Housing Programme, depicting photographs, coloured layout plans and designs of the various types of houses at different aerodromes such as Gauhati, Bombay, Calcutta, Vizagapatnam, Patna, Bagdogra, Banares, Ahmedabad, Trichunopoli, Agartala, Amritsar, Lucknow, Madras and Nagpur. A map of India shows the various air ports where the housing schemes are implemented and are in progress.

In addition to these Exhibits, there are also shown in the Hall, scale models of the Telegraph Training Centre, Jubbalpore, the offices of the Central Board of Revenue and the proposed underground railway station, Greater Delhi.

MEMBERS OF COMMITTEES

LIST OF MEMBERS OF STEERING COMMITTEE

1. Shri S. Ranganathan, I.C.S., Secretary, Ministry of Works, Housing and Supply (Chairman).
2. Dr. S. S. Bhatnagar, Secretary, Ministry of Natural Resources and Scientific Research (Member).
3. Shri F. C. Badhwar, Chairman, Railway Board.
4. Joint Secretary, Ministry of Works, Housing and Supply.
5. Shri S. Ratnam, Joint Secretary, Ministry of Finance.
6. Shri M. S. Mathur, I.S.E., Chief Engineer, C.P.W.D., or his nominee.
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ACKNOWLEDGEMENTS

The Ministry of Works, Housing and Supply are grateful to all those who have lent a helping hand and have cooperated in making the Exhibition a success.

The Ministry are greatly indebted to the Railway Board who readily lent the structures and fittings, which they had set up on the Exhibition Grounds last year.

The mural paintings at the Exhibition have been executed by the artists of the All India Fine Arts and Crafts Society, the Society of Free Lance Artists, and the Delhi Polytechnic Art Department. The artists have been good enough to do some of the murals free of cost and we are deeply appreciative of this good gesture shown by them.

The Associated Cement Companies Ltd. have very graciously donated the Boat Restaurant, built at their cost, to the Exhibition, and the Ministry take great pleasure in acknowledging this fine gesture.

The President of the Calcutta Zoological Gardens must be thanked for making available free of charge a large variety of birds and animals which has added to the charm of the Exhibition.

Messrs. Alsalls Ltd., Calcutta were good enough to supply free of cost 1,500 R.ft. of Maxwell Fabric used for the enclosure of birds and animals.

The Development Department, Delhi State, have made a valuable contribution by supplying fish of different varieties for the Serpentine.

Messrs. Crompton and Co. have to be thanked for providing free of cost stage lighting and other allied equipment in the Theatre.

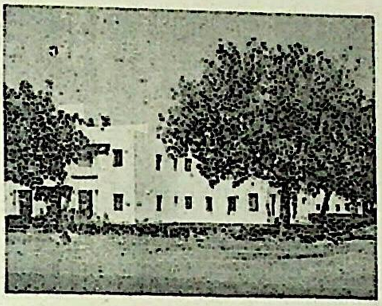
Despite their heavy obligations, the Delhi Regional Transport Authority have provided special transport facilities to suit the convenience of the visitors to the Exhibition from various parts of the city. They have put on extra buses and have diverted the routes of some others during the days of Exhibition. A new request bus stop has also been put up opposite the Exhibition main-gate.

The Automobile Association of Upper India have taken extra pains in making out a Car-Park for the convenience of the visitors.

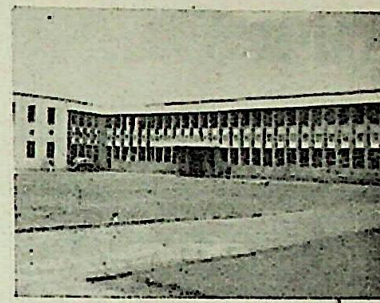
The New Delhi Municipal Committee, the Delhi Municipal Committee, the Delhi State Electricity Board and the Indian Red Cross Society have all to be thanked for the aid they have rendered in making the Exhibition a success.

The Ladies' Committee—a gallant band of selfless workers—has rendered yeoman service in organising an amateur competition on the decoration of the houses at low-cost, in running a cafeteria and in helping the organisers of the Exhibition in countless other ways.

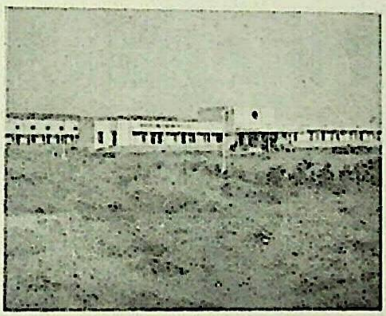
It is difficult to find words to thank adequately the Central Public Works Department, without the help and guidance of whose Architects and Engineers it would not have been possible to hold an Exhibition of this magnitude.



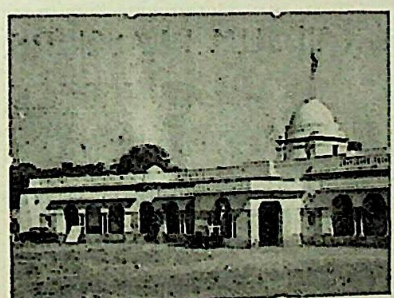
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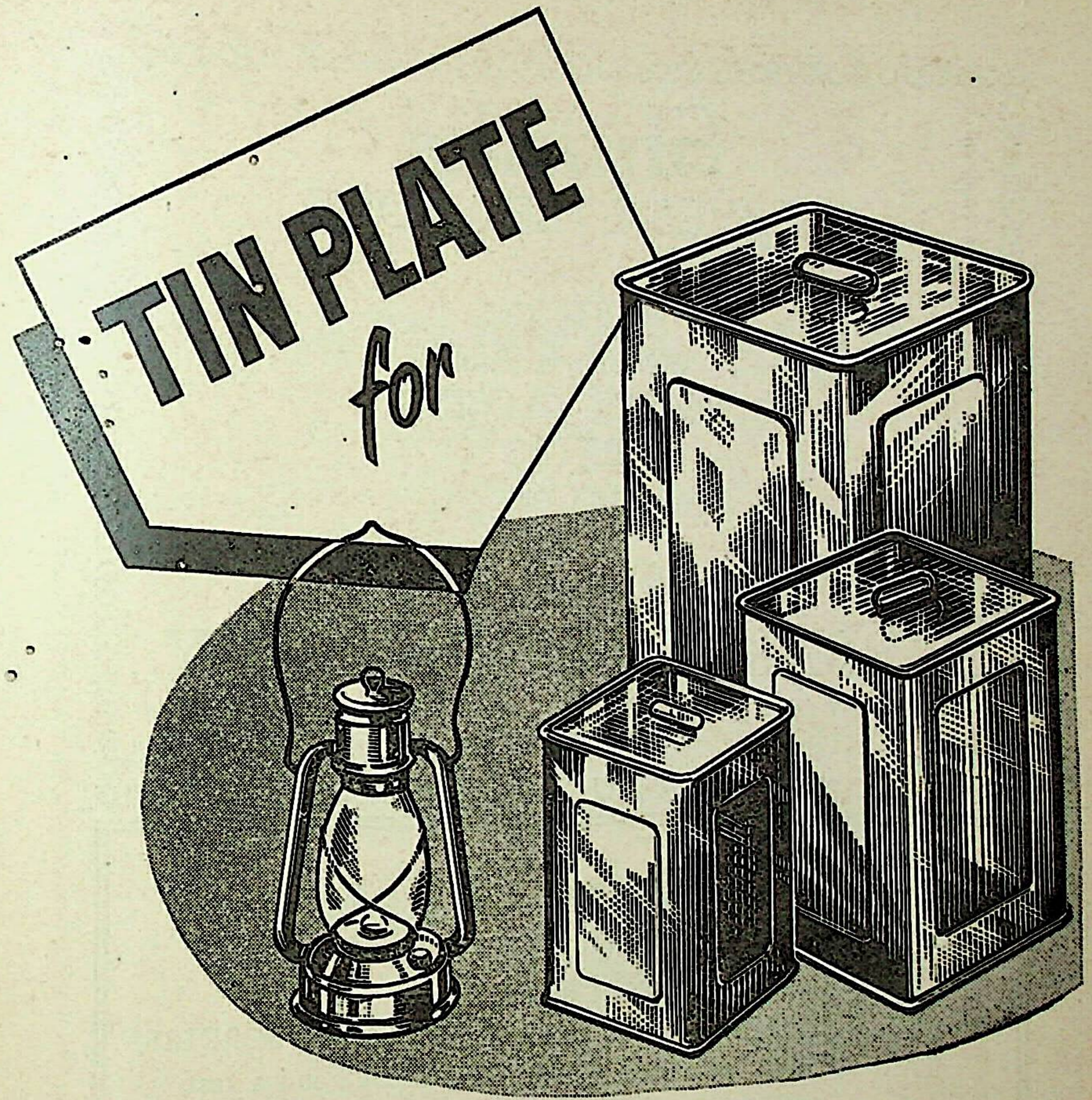


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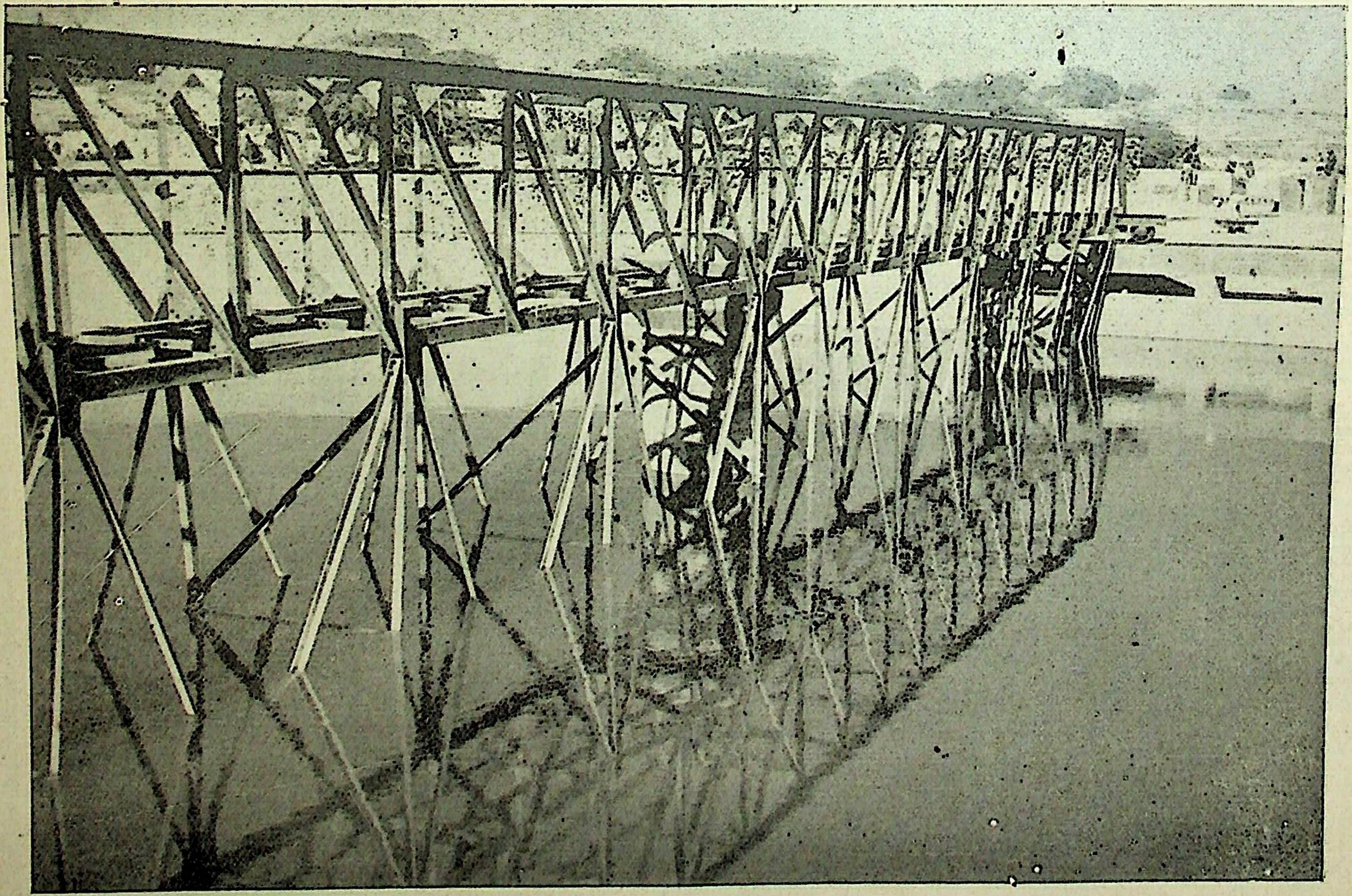


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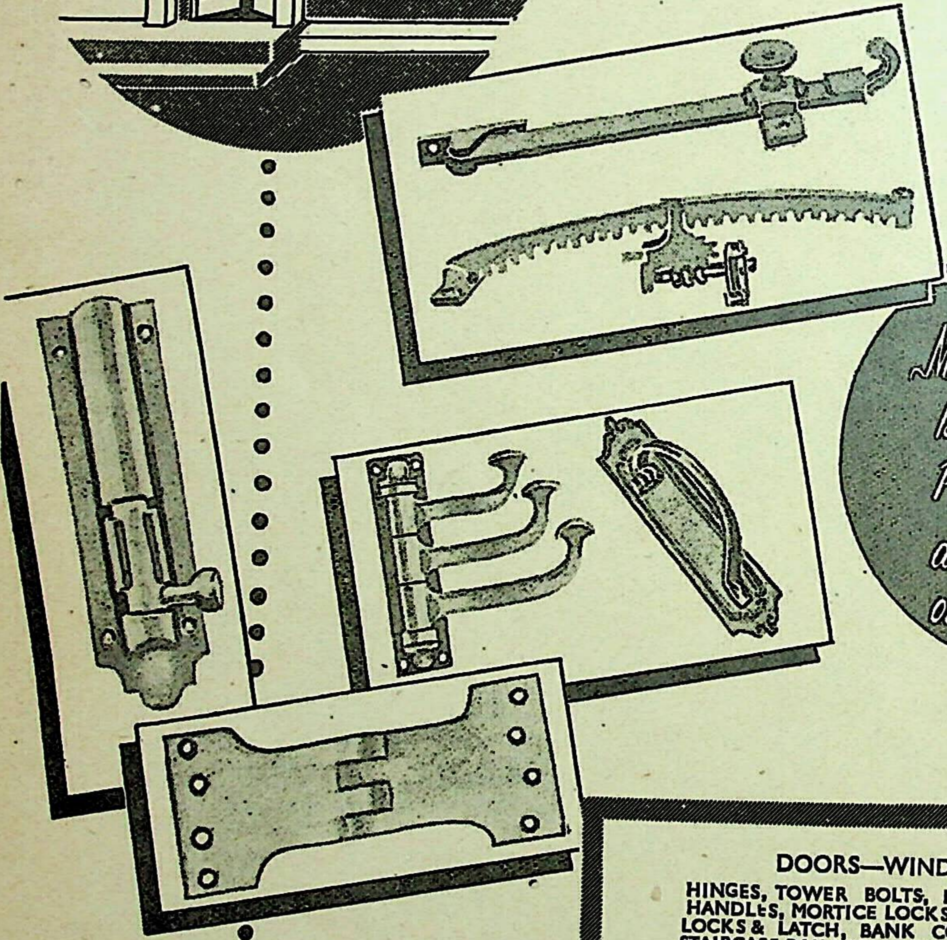
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